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ON THE

EVOLUTION OF THE PUPILLARY REACTIONS.

Delivered at the Royal College of Surgeons in Ireland

BY E. TREACHER COLLINS, F.R.C.S. ENG.,
CONSULTING SURGEON, ROYAL LONDON OPHTHALMIC HOSPITAL, AND OXFORD EYE HOSPITAL.

REGARDING knowledge of the biological evolution of a vital phenomenon as essential for the study of its manifestation in man, I have collected observations from various sources regarding the pupillary reactions in animals, in the endeavour to investigate the upgrowth of their mechanism.

In 1890, being desirous of examining the arrangement of the pigment epithelial cells in the uveal tract, I introduced a method of depigmenting microscopical sections of the eye by means of chlorine water and a weak solution of hydrochloric acid, which I described in the Royal London Ophthalmic Hospital Reports for December of that year. Since that time several improved methods of bleaching sections have been adopted. That most usually employed now is Alfieri's method with permanganate of potash and oxalic acid. By such depigmentation several new anatomical points in connexion with the histology of the iris and ciliary body have been discovered. By it Henry Juler and John Griffiths[1] were able to demonstrate, in 1894, the presence of dilator contractile fibres in the nucleated layer at the back of the iris, immediately in front of the posterior layer of pigmented cubical epithelial cells.

DEVELOPMENT OF MUSCLE FIBRES OF THE IRIS.

It was by bleaching sections that Grynfeltt[2] in 1899, Heerfordt[3] in 1900, and Forsmark[4] in 1905, proved that Bruch's membrane in the iris is formed of fibres derived from cells in the outer layer of the secondary optic vesicle.

It was shown that these cells are at first cylindrical or cuboid, and contain nuclei at or near their centres, and that later the anterior part of each cell is differentiated by the outgrowth of a contractile fibre, while the nucleus and the pigment are displaced towards the posterior end. The fibres blend to form the dilator muscle of the iris, which is, therefore, an epithelial structure.

The researches of Nussbaum[5] in 1899, and of Szili[6] in 1901, showed that the sphincter muscle of the iris, like the dilator, originates from the anterior layer of the pigment epithelium on its posterior surface, starting at the point where it folds backwards to become the posterior layer.

The sphincter appears first as a group of nuclei which soon extends in the direction towards the ciliary border of the iris, its cells assuming the spindle-shape and remaining for a time closely connected with the anterior epithelium. About the fifth month, in the human fœtus, connective tissue from the iris stroma begins to insert itself between the sphincter and the epithelium, from the outer side, and a month later the muscle is divided by septa of connective tissue into two or three parts. At birth the sphincter still lies to a large extent upon the epithelium and remains united with it at the pupil margin. Sphincter and dilator therefore are both epithelial structures springing from the same layer of cells. They are connected with each other by numerous fibres of the same nature as themselves.

More recently, in 1922, Holth and Berner,[7] by bleaching sections of the iris, have proved that cases of congenital miosis are due to aplasia of the dilator muscle of the pupil.

A study of the morphology of the ciliary muscle in mammals shows that it is composed of spindle-shaped unstriated fibres, lying in spaces corresponding to those of the lamina supra-choroidea in the hinder part of the globe and to those of the ligamentum pectinatum anteriorly. The cells lining these lymphatic spaces are endothelial cells, and the ciliary muscle is formed by the proliferation and lengthening out of such endothelial cells into spindle-shaped cells. In the eyes of animals, and in pathological specimens of human eyes, cells are met with in the vicinity of the ciliary muscle fibres presenting transitional stages between endothelial cells and muscle cells. Cases have been recorded by Salzman and Fuchs in which muscle fibres have been met with in the lamina supra-choroidea, even as far back as the neighbourhood of the optic papilla. Evidently, therefore, the fibres of the ciliary muscle, unlike those of the iritic muscles, are mesoblastic in origin.

At first it seems strange that muscle fibres should be developed from cells of the neural epiblast, and that in two adjoining parts of the uveal tract—the iris and the ciliary body—which in the human eye are so frequently associated in their action, they should have been derived from different layers of the blastoderm. Here again I think a consideration of the morphology of the parts enables us to understand how this has come about.

DIRECT RESPONSE OF IRIS MUSCLE TO LIGHT IN SOME COLD-BLOODED VERTEBRATES.

It has been found that in amphibians and fishes light causes contraction of the pupil in the excised eye. The iris of an eel when cut out and placed in normal saline solution, contracts to the stimulus of light, which contraction seems to be due to direct action of light on its muscular fibres. The pigmented cells which compose the outer layer of the secondary vesicle, where it lies in contact with the retina, when stimulated by light manifest amœboid movements. They send out processes which protrude inwards between the outer segments of the rods and cones. Such movements are accompanied by currents in the fluid cell protoplasm, and migration of the long pigment particles into the processes from the body of the cell; they are very pronounced in fish and frogs and other cold-blooded animals.

Protoplasmic movement, the result of photic stimuli, is common in plants but comparatively rare in animals. It is met with in some of the lowest forms of animal life, in some fresh-water amœbæ, some hydra, and some of the ciliated infusoria. In the tissues of higher animals such movements have been retained only in the cells of the visual organs. It has been found that phototaxis in lowly developed organisms is chiefly, if not solely, brought about by rays of short wave-length, the blue, violet, and ultra-violet; which suggests that the real stimulus is chemical, not thermal in character, and similar to that produced by the action of light through chlorophyll in plants. That some chemical action is produced in the pigmented cells of the retina, by the action of light on them, is shown by their alkaline reaction being turned into an acid one, due probably to an oxidising process, the pigment granules in the cells, by the absorption of light, assisting in such changes of light-energy into protoplasmic movement.

In a fish's eye, like that of an eel, which has no ciliary body, the outer layer of cells developed from the secondary optic vesicle, where it ceases to line the retina, is continued directly on to the back of the iris. As those cells which line the retina have phototactic powers it is not surprising to find similar powers present in those which line the iris. Those which line the retina receive the stimulus of light on their inner surface, and protrude processes from it into the potential spaces between the rods and cones. Those lining the back of the iris receive the light stimulus on their outer surface which have processes proceeding from it, constituting the so-called membrane of Bruch, or dilator muscle of the iris. These cells of the outer layer of the secondary optic vesicle at the back of the iris lie flattened out against the stroma. Their processes do not project into it but run radially, so that when they become retracted in the dark the pupil dilates. The sphincter muscle is composed of spindle-shaped cells, which have budded off from the point of junction of the two layers of the secondary optic

vesicle at the pupillary margin, and run concentrically with the pupil in spaces in the stroma. When stimulated by light they expand antero-posteriorly, contracting laterally, so causing contraction of the pupil.

The formation of a screen in the front part of the eye with a central opening, capable of contraction and expansion, seems primarily to have been acquired for the purpose of regulating the amount of light admitted to the eye. In the eyes of cephalopods and fishes the static refraction is myopic and accommodation is for distance, produced by retraction of the globular lens into nearer approximation with the retina, without any alteration taking place in its curvature. These animals have no ciliary body and no suspensory ligament; the iris does not lie in contact with the lens and can play no part in accommodation.

Pupil Reaction in Fishes.

In fishes' eyes the muscles of the iris are but poorly developed, and the rapidity of reaction of their pupils to light is comparatively slow. In those of nocturnal habits, whose retinæ are probably particularly sensitive to light, the pupils in the daytime contract to an excessive minuteness (Beer). In some of the flat fish (as the thornback, *Raja clavata*) there is a projecting lobe from the upper border of the iris, which contracts over the pupil when the eye is exposed to bright sunshine. It consists of a crescent-shaped membrane with projecting processes at its free margin, and is composed of tissue similar to the stroma of the iris lined by pigment epithelium. In this animal, whose flat body-surfaces are truly dorsal and ventral, the eyes are situated dorsally and look directly upwards. It has no eyelids, and unless protected by some such pupillary curtain would be constantly exposed to the sun's glare. Flat fish, such as plaice (*Pleuronectes platessa*), in whom the body is flattened from side to side, not from above downwards, have their heads so twisted that both eyes are on the upper surface, but raised up from it so that their optical axes are directed laterally, and the pupils do not require protection by an extra lobe of the iris. In the eyes of many fish the membrane argentina of the choroid is continued on into the iris, where it forms a brilliantly reflecting surface, by which objects at the short range for which their eyes are focused when at rest can be illuminated. Possibly the sphincter muscle of the iris by its contraction to light may, in these animals, serve the subsidiary purpose of increasing the reflecting power of the membrane by making it tense.

The most remarkable form of adaptation in the eyes of fishes to suit different environments is that found in the *Anableps tetrophthalmus*, in which the cornea is divided into two halves by a dark strip of conjunctiva extending horizontally across it, and where the iris is perforated by two pupils, one opposite each division of the cornea. By this arrangement, and by the elevated position of the eyes on the surface of the animal's head, it is able to swim on the surface of the water, using the upper pupil and upper half of the cornea for aerial vision, and the lower pupil and lower half of the cornea for subaqueous vision. Though a different form of dioptric apparatus is necessary for vision in the two different media, for each a contractile pupil is required.

Contraction of Iris in Mammals a Reflex Act.

In the course of evolution the contractile power of the muscular tissue of the iris becomes changed, from one of direct action to the stimulus of light into a reflex act. No contraction of the iris tissue to light takes place in mammals when the iris tissue has been severed from its connexions with the central nervous system. It loses its phototactic action but retains its contractile power. In the reflex act of the pupil following the stimulation of the retina by light, the sphincter muscle, which is innervated by the third cranial nerve from fibres originating in its nucleus in the floor of the aqueduct of Sylvius, seems to be alone concerned. Several observers have found that after section of the third nerve variations in light produce no effect on the pupil. When the sphincter has been paralysed by the instillation of atropine no further dilation is effected by decreasing illumination. The dilator fibres of the iris, which are innervated by the cervical sympathetic, when they lose their phototactic powers, play, therefore, no part as an antagonistic to the sphincter in the pupillary-light regulating mechanism. Their action must have been evolved for some entirely different purpose.

EXPLANATION OF LONG COURSE OF FIBRES SUPPLYING DILATOR MUSCLE OF IRIS.

The nerve fibres supplying the dilator muscle of the iris take what at first seems to be a strangely long and circuitous course. Much experimental work has shown that, starting somewhere in the mesencephalon, they extend through the medulla oblongata into the lateral columns of the cord to the centrum cilio-spinale inferius in the dorsal region. They leave the cord by the ventral roots of the first, second, and third dorsal nerves to join the cervical sympathetic, from which they pass through the Gasserian ganglion to the first division of the fifth nerve and enter the eye with the long ciliary nerves. The excursion of these fibres down to the centrum cilio-spinale inferius in the dorsal cord seems to indicate that they were evolved at a time when, as in fish and amphibia, the cervical region was undeveloped, and that the displacement of the centre from the neighbourhood of the eye has been occasioned by the development of the neck.

On this matter I cannot do better than quote what Ferrier [8] has written: —

> The vasomotor nerves of the head and the dilator nerves of the pupil seem at first sight to pursue an unnecessarily roundabout path. Having their centres in the medulla oblongata, why, one asks, should they go all the way down to the upper dorsal region of the cord before emerging to join the sympathetics, seeing that anatomically they might reach their destination in a more direct manner? The explanation of this fact is without doubt to be sought for in embryology. I had, on purely physiological grounds, formed the speculation that the medulla oblongata should, as regards all organic functions, be looked upon as the direct continuation of the dorsal spinal cord, the cervical region being merely intercalated for the innervation of the upper extremities and their related parts. My friend Prof. Kitchen Parker, to whom I referred on this point, kindly pointed out to me facts of development which seem to me entirely in harmony with the speculation I had formed. Thus in the embryo of all animals, the heart is at first in close relation with the head and the cerebral vesicles, but ultimately, as development proceeds, comes to lie at some distance posteriorly. The distance is extremely variable in different classes of animals, and depends on the number of cervical segments which are developed. In osseous fishes, in which the cervical region is absent, the heart is in the closest relation with the head, and the first spinal nerve, succeeding the vagus, communicates with the second, and supplies among others the muscles of the pectoral fin, which is the homologue of the hand or arm in man. Therefore the region of the spinal cord, which, as regards function at least, corresponds to the lower cervical or upper dorsal segments in the monkey, comes in the fish immediately after the origin of the vagus. In the myxine, or hag, however, the heart is situated a very considerable distance posterior to the head—below the fortieth spinal segment. This has been conditioned by the development of a large number of segments for the powerful musculature of the upper part of the body. There is every reason for believing, however, that in the embryo hag the heart at first occupies the same position in relation to the head that it does in other embryos. As, therefore, the vagus elongates in proportion to the distance of the heart and viscera from the medulla oblongata, so also the spinal tracts which connect the face, originally short and direct, become elongated by the intercalation of the cervical segments which are developed for the innervation of the upper extremities and their annexes. Hence they ultimately emerge by the anterior roots of the upper dorsal nerves, and re-ascend in the cervical sympathetic to their destination.

DILATATION OF PUPIL FROM EMOTIONAL AND SENSORY STIMULI.

Dilatation of the pupil occurs not only from absence of light, but also as the result of the application of sensory stimuli to various parts of the body, and of physical influences. Experimentally it may be produced by the stimulation of the cerebral end of any sensory nerve,

and by the stimulation of certain areas on the cerebral cortex. Parsons[9] found that electrical stimulation of the cortex of cats, dogs, and monkeys, in the neighbourhood of the crucial sulcus and over a considerable area of the occipital region, produced wide dilatation of the pupils when the cervical sympathetic nerves were intact, and a dilatation of about a half or two-thirds that amount when those nerves had been divided.

Dilatation of the pupil caused by section of the third nerve may be increased by stimulation of the cervical sympathetic; and cocaine, which acts by stimulation of the terminals of the cervical sympathetic, will cause a pupil dilated by atropine to enlarge still further. Fright, such as that produced by a sudden and unexpected noise, causes the pupils to dilate widely, even whilst the retina is being stimulated by exposure to bright light. Wide dilatation of the pupil enlarges the field of vision by allowing rays of light to pass into the eye which, owing to their obliquity, would otherwise be cut off. Such an enlargement of the field of vision is of considerable importance to those animals which require a large range of circumferential vision to warn them of the approach of danger. In most of the ungulata, whose safety mainly depends on their rapidity of flight, an increased range of circumferential vision is further provided for by horizontally oval-shaped pupils.

Stimulation of the cervical sympathetic nerve, besides exciting into action the dilator muscle fibres of the iris, causes contraction of the two sets of unstriated muscle fibres in the orbit described by Müller—viz., that which causes widening of the palpebral fissure by retraction of the upper eyelid, and that which causes protrusion of the eyeball. An enlargement of the palpebral fissure and an increased prominence of the eyeball, like dilatation of the pupil, serve to increase the range of vision; the three symptoms are characteristic of fright. It seems, therefore, most probable that they have all three been evolved for the same purpose—that is, to enable animals to perceive and escape quickly from approaching foes.

The instinct of flight, which is usually evoked by the emotion of fear, may be called into action in different ways. The stimulus may be received through the auditory nerve from some sudden and unexpected sound; through the optic nerve by the perception of some approaching danger; or through the cutaneous surface by the sensation of pain. In whichever way elicited the fibres of the cervical sympathetic nerve become stimulated, causing contraction of the muscle fibres supplied by it, of which one set are those that dilate the pupil. Every anæsthetist knows that if an operation is commenced before a patient has become fully insensitive to pain, a skin incision will be followed by dilatation of the pupils. Claude Bernard,[10] in 1862, found that the experimental stimulation of the cerebral end of any sensory nerve was followed by dilatation of the pupils. Anderson describes how in a series of experiments he obtained such dilatation after the pupillo-constrictor tract had been divided, whereas he was unable to obtain it after the cervical sympathetic had been cut.

In the mydriasis brought about by emotional influences, acting through the sympathetic nerves on the dilator fibres of the iris, may be found an explanation of the influence which psychical conditions, such as those produced by worry and anxiety from bereavements or business losses, have in exciting the onset of glaucoma. Those of an emotional temperament manifest a predisposition to glaucoma, perhaps those who manage to suppress its outward signs more than those who give way to them. Females, the more emotional sex, suffer more frequently from glaucoma than males, especially the congestive type. Priestley Smith[11] estimated the ratio between the two sexes as 56·9 per cent. males against 43·1 per cent. females, and Kagoshima,[12] in Japan, as 61·9 per cent. females against 39·09 per cent. males. Widows seem specially liable to the disease. Thus I found out of the 117 cases 74 were females and 43 males; of the 74 females 38 were married, 27 widows, 7 single, 2 unrecorded; of the 43 males 31 were married, 8 widowers, 1 single, 3 unrecorded.

Antagonism between Sphincter and Dilator Fibres.

Though in the reaction of the pupil to light in mammals the sphincter muscle is alone concerned, in respect to what is sometimes termed muscular tone some antagonism between the sphincter and dilator fibres appears to exist. In defective development, paralysis, and degeneration of the dilator fibres, the uncontrolled action of the sphincter muscle produces a condition of miosis. In Holth and Berner's[7] cases of congenital miosis they demonstrated defective development of the dilator muscle. In paralysis of the cervical sympathetic nerve-supply to the dilator muscle the pupil becomes contracted. The miosis met with in spinal disease, which though sometimes associated with loss of light reflex (Argyll Robertson pupil) may occur independently of it, is probably caused by a lesion of the cilio-spinal centre in the cord. Senile miosis is most likely due to degenerative changes in the dilator fibres, though of this at present there is no anatomical proof.

Congenital defects in the development of the sphincter muscle are only met with in association with gross deficiency in the formation of the iris. Apparently the sphincter muscle is not liable to senile degeneration as the dilator seems to be. When, however, it is paralysed with atropine the degree of mydriasis produced has been found to be decreased by section of the cervical sympathetic nerve, which seems to show that the unopposed antagonistic action of the dilator muscle produces a greater effect than that produced by mere paralysis of the sphincter. Contraction of the pupil has been frequently described as occurring in connexion with efforts to close the eye forcibly. It has been observed when the lids are kept apart by a speculum, whilst such efforts are being made. It has been suggested that this reflex is connected with the contraction of the orbicularis muscle, and that it is due to an overflow of stimulus passing from the nucleus of the seventh to that of the third. I would suggest that a more probable explanation is that the contraction of the pupil results from relaxation of the normal tone of the dilator muscle, associated with a relaxation of Müller's muscles, which raise the upper eyelid and protrude forwards the eyeball. When the eyelids are forcibly closed these two muscles, which, like the dilator fibres, are supplied by the cervical sympathetic nerve, would necessarily become relaxed.

The antagonistic action between sphincter and dilator muscles becomes strikingly manifest in diseased conditions, giving rise to the symptom which is termed hippus. A slight oscillation of the pupil after stimulation by light may sometimes be observed under normal conditions, but it becomes markedly increased when the conducting power for the afferent impulses of the light reaction are impeded, as in retrobulbar inflammation of the optic nerve.

Consensual Reaction in Relation to Binocular Vision.

Binocular vision, which is produced by the translation forwards of the eyes from the sides of the head so that the two fields of vision overlap, is present in some of the carnivorous fish, reptiles, and birds. In all these animals, however, there is complete decussation of the optic nerve fibres at the chiasma, so that the binocular vision is not stereoscopic vision, all the visual impressions received by the retina of one eye passing to the opposite side of the brain. All the afferent impulses for pupillary light reflex received from one eye likewise pass to the opposite side of the brain, and there is no consensual pupillary reaction. Amongst mammals there are some rodents who have complete decussation, and others, like rabbits, in whom it is almost complete. In the horse and calf, amongst the ungulata, it has been found that about one-sixth of the optic nerve fibres turn into the tract of the same

side. Neither in rodents nor in the ungulata is any consensual pupillary reaction to be detected; apparently in those of them in which semi-decussation takes place there is an absence of pupillary fibres in the uncrossed bundles. It is in the carnivorous mammals, to whom stereoscopic binocular vision is of some importance for the judgment of distances in pouncing on their prey, that consensual pupillary light reflex is first met with.

Wilfred Harris [13] found that experimental division of the optic tract on one side in cats produced distinct homonymous hemianopia, with the hemianopic pupil reaction, and with considerable diminution of the pupil reaction to direct light in the opposite eye, though its consensual reaction was brisk on exposure of the other eye to light. This indicates, as Wilfred Harris points out, that the decussating optic bundle is much larger than the uncrossed bundle in the cat, as Ramón y Cajal has figured, and therefore the light stimulus, when conducted only by the small uncrossed bundle from the opposite eye, is much more feeble in causing pupil contraction, than when it is conducted by the large decussating bundle from the nasal side of the retina on the same side. In man, in cases where one optic tract is affected by disease, and where there is hemianopic pupil reaction, the briskness of the two pupils to light is nearly equal, whichever pupil is exposed to light. From which, as Harris says, we may infer that the size of the uncrossed bundle in man, and probably also in monkeys, is proportionally larger than in cats.

The highest form of stereoscopic binocular vision is that in which impressions from each macula become super-imposed on each side of the brain. The fovea centralis is only met with in mammals amongst apes and man. It has been developed as the result of arboreal life in which the fore limbs are used for prehensile purposes, and for picking up and conveying food to the mouth. With the development of acute central stereoscopic vision there has arisen the capacity of accommodation and convergence, and associated contraction of the pupil.

REACTION OF PUPILS IN ASSOCIATION WITH ACCOMMODATION AND CONVERGENCE.

The lowest mammals have little if any power of accommodation. In the echidna and in the great ant-eater the ciliary muscle is practically non-existent. In rabbits only a few scanty fibres are recognisable. In the ungulata longitudinal fibres form a considerable band, which becomes more pronounced in the carnivora. The aquatic carnivora, such as seals and otters, require to see in two different environments, air and water. The similarity of the refractive index of the cornea and water tends to render them, when in that media, highly hypermetropic, to overcome which they have developed considerably their intra-ocular muscles, so increasing their powers of accommodation. The sphincter muscle of the iris in these animals is unusually large, extending even up to its periphery. In apes and man amongst mammals the power of accommodation and the ciliary muscle reach their greatest development.

In mammals which have their eyes situated laterally in the head, as in most of the rodents, no convergence can take place. In the ungulata, when their attention is suddenly attracted, some movement from divergence toward parallelism can be detected. In the carnivora more obvious attempts at convergence take place. It is, however, only when we come to the monkeys which have developed a fovea with a high degree of central acuity of vision, that the power of converging the optical axes becomes a prominent feature. Contraction of the pupils, by cutting off circles of diffusion, must assist those animals whose eyes in the static condition are focused for distance, in seeing near objects apart from any accommodation which may take place. In a paper entitled "Apparent Accommodation in Aphakia," which I read at the Ophthalmological Society in 1915, I showed that after the removal of soft cataracts the presence of a small central hole in the capsule, together with a freely acting pupil, enables a patient to obtain full acuity of central vision both for far and near with the same lens. For animals requiring acute central stereoscopic vision for different distances the power of varying the size of the pupils in association with accommodation and convergence must be of great assistance. It is a form of pupillary reaction which has been evolved much later than, and quite independently of, the pupillary light reflex. The light reaction is a simple reflex act in which the centres in the mesencephalon are alone involved. The reaction of the pupils in association with convergence is not a simple reflex act, but an involuntary act which has become linked up with a voluntary one represented by centres in the visual cortex.

Contraction of the pupils in association with convergence without accommodation has been definitely demonstrated, but it is very doubtful if contraction takes place in association with accommodation apart from convergence. All three movements are connected with different parts of the third nerve nucleus; the impulses stimulating both the ciliary muscle and the sphincter muscle of the iris pass through the ciliary ganglion and enter the eyeball along the short ciliary nerves. It is probable that accommodation and contraction of the pupil, though not themselves definitely connected, both bear the same relation to convergence, and are both together stimulated into action by that voluntary movement under the control of higher centres in the cerebral cortex.

The independence of the pupillary reactions in connexion with light and convergence, both as regards their evolution and control, is of considerable interest in connexion with diseased conditions where one mode of reaction may be destroyed whilst the other remains unimpaired. In the Argyll Robertson phenomenon, where the reaction to light is lost whilst that to convergence remains, and which is such a common accompaniment of tabes, the lesion is probably one affecting the centripetal pupillary light reflex fibres somewhere between the optic tract and the oculo-motor nucleus, though as yet its site has not definitely been demonstrated by anatomical investigation.

The opposite condition, that of loss of pupillary reaction in association with convergence whilst that in connexion with light remains, is of much less frequent occurrence. It has been met with as a congenital defect, in rare cases in connexion with tabes, in cases of syphilitic basal meningitis and tumours of the corpora quadrigemina. A few cases of paresis of convergence without loss of conjugate movements in any direction have been recorded. Thus Henry Eales,[14] in 1884, described the case of a girl, aged 13, in whom, without any other sign of disease, there was complete paralysis of convergence and accommodation, the bilateral conjugate movements, both upwards and downwards and from side to side, being unimpaired. Though both pupils acted freely to light they did not contract when she looked at near objects.

The close association of the action of the pupils with convergence is also well demonstrated by a case recorded by Holmes Spicer [15] in 1902. It was that of a man, aged 44, who 15 years previously had primary syphilis and presented symptoms of early tabes. His pupils did not react to light and his convergence was weak. When he looked steadily at a near object his visual axes were parallel and the pupils small and equal to 2 mm. If one eye was covered it diverged and at the same time the pupil of the fixing eye as well as of the covered eye slowly dilated to 8 mm. On bringing both eyes into action again the visual axes became parallel and the pupils contracted. His convergence being weak to maintain binocular vision for distance, a strong effort at convergence was necessary; the association of the action of the pupils with convergence caused a marked contraction of the pupils. When one eye was covered it diverged, relaxation of convergence took place, and at the same time the pupils dilated.

EVOLUTION OF INTRA-OCULAR MUSCLES.

It is generally agreed that mammals in the process of evolution branched off at an early date, as a different stem from reptiles and birds, from some common reptile root. The sauropsids (under which term reptiles and birds are classed) and mammals each present anatomical characteristics which, whilst common to all their members, are markedly different in the two groups. This applies to the structure of their intra-ocular muscles; in the sauropsids they are composed of striped fibres and in mammals of unstriped. The first discovery of an internal muscular apparatus in the ciliary region was made in birds in 1813 by Dr. Crampton, afterwards Sir Philip Crampton, Bart., who was three times President of the Royal College of Surgeons in Ireland. Though earlier writers had put forward theories of accommodation which involved the presence of muscular fibres none had previously demonstrated their existence by dissection.

Reptiles, such as lizards who feed on small insects which they snap up rapidly with their tongues, require not only a very high degree of acuity of vision, but also the power of accommodating up to within a few centimetres. The chameleon which has remarkable powers of rotating its two eyes in different directions, can converge their axes on the victim it is about to catch and devour. The rapacious birds which sight their prey from enormous distances, and those of the sparrow kind which feed on minute seeds and insects, possess not only a visual acuity but also a power of accommodation vastly superior to that of man. It is not surprising, therefore, to find that the iris, which plays such an important part in association with accommodation, is provided with more extensive and more rapidly active muscular tissue in reptiles and birds than in mammals.

The general plan of the arrangement of the striate muscle fibres in birds and reptiles is in two planes: the anterior sphincter fibres running a circular course, and the posterior dilator fibres having a radial direction. In birds there is a marked development of the circular fibres at the periphery of the iris where they form a distinct prominence on its surface. Variations from this general plan are met with in different species. The striated sphincter pupillæ muscle in birds has, like the unstriated sphincter in mammals, been shown by Nussbaum to be formed from epithelial cells at the pupillary margin of the optic cup. Lewis has further shown that the more peripheral muscle fibres in bird's irides are produced from cells budding off the anterior pigment epithelial layer some distance external to the pupillary margin. Crampton's muscle in birds, Lewis[16] found, like the ciliary muscle in mammals, to be derived from mesoblast. As the optic nerve fibres decussate completely at the chiasma in birds and reptiles, they have no consensual reaction of the pupils to light and no stereoscopic vision, as in man. Birds, however, possess some voluntary control over the movements of their pupils, this voluntary movement being bilateral whilst the light reflex is only unilateral.

EVOLUTION OF NUCLEUS OF THE THIRD NERVE.

The researches of Davidson Black[17] and others on the phenomenon of Kappers's[18] neurobiotaxis (i.e., the shifting of nerve cells in the central nerve system in the direction of the point whence the majority of stimuli reach them) have shown that in the phylogenetic development of the third nerve nucleus certain changes take place which may be correlated with elaboration in the intra- and extra-ocular movements. Anatomically the third nerve nucleus in man and monkeys is found to be composed of different groups of cells. There are two main lateral ones composed of large cells, crescentic in shape with the concavity outwards; and a median one, known as the nucleus of Perlia, also composed of large cells. Between the anterior rounded extremities of the lateral crescentic nuclei, almost touching the middle line, are two groups of smaller cells which are termed the Edinger-Westphal nuclei.

The most recent experimental work on the association of different parts of this nucleus with the control of the intra-ocular muscles tends to prove that the Edinger-Westphal groups of cells are centres for constriction of the pupil, that the centre for convergence being situated on the inner aspect of the central part of the median group of cells, and that for accommodation at its posterior end. In the lowest species of fish and in sharks the nucleus of the third nerve is found to consist of a group of cells undifferentiated into any specific areas. Some differentiation away from this primitive condition is met with in ganoid and teleostean fish, but not in the dipnoans or lung fish, which latter present the most distinct signs of transition between fish and amphibians. Such differentiation can, therefore, hardly be regarded as a precursor of the subgrouping which has been found in anuran amphibia, reptiles, birds, and mammals. Writing on this matter Davidson Black says:

> It would thus seem probable that the factors which determined the anuran oculomotor cell-arrangement must have appeared comparatively late in phylogeny. The eyes of most fishes are normally focused for near objects when at rest, and since the eyes of most amphibians, reptiles, birds, and mammals are normally focused for distance, it is not improbable that the chief original cause of the amphibian oculomotor specialisation may be seen in the readjustment of accommodation which must have taken place in phylogeny during the evolution of the amphibian type.

Kappers pointed out how, in the arrangements of the elements of the anuran amphibian oculomotor nucleus, a first stage in the evolution of the more highly specialised sauropsidan condition may be recognised. More recently the evolution of the Edinger-Westphal nuclei, the blending in a central raphé of the nuclei of the internal recti, with the growth of the nucleus of Perlia, in association with the development of accommodation and convergence, has been depicted in a graphic fashion by Brouwer.

CENTRES FOR CONVERGENCE AND DIVERGENCE.

In spite of the large amount of experimental work that has been done in connexion with the associated movements of the eyes, there is still much to be learnt regarding the cortical centres for convergence and divergence, and as to the course taken by the fibres which connect them with nuclei of the ocular nerves in the aqueduct of Sylvius. Such evidence as we have seems to show that in the cerebral cortex there are centres both in the occipital and frontal lobes, the bilateral stimulation of which gives rise to these associated movements of the eyes. In the occipital lobes the centres for ocular movement are situated in close proximity to the visual centres, and seem closely associated with sensory stimuli, the movements being made for the purpose of fusing images received from the two eyes in the desire for binocular vision. In the frontal lobe the centre for convergence has been located near the angle of the precentral fissure (Sherrington), and that for divergence in front of the middle of that fissure (Bechterew); they seem to be more particularly connected with voluntary movements.

As the result of a consideration of his own and others' experiments, of the effects on the pupil from stimulation of various areas in the cerebral cortex, Parsons[9] says it seems probable that there are foci for pupil constriction both in the frontal and occipital areas, but that they are often masked by the dilator effects, which are much more readily produced. He sums up his observations by saying:—

> It is unlikely that we are dealing with "centres" for the pupils, in the ordinary sense of the term. We have found that the effect is most specifically obtained from the areas which are concerned with ocular movements, whether from the motor or the sensory side. Moreover, it would seem that the effect is indissolubly connected with those movements, and does not occur in their absence. Hence it is most reasonable to conclude that the phenomenon is an associated effect.

In such experiments I would suggest that it is most probable that the centres for convergence or divergence, being either excited or inhibited, the associated movement of either contraction or dilatation of the pupil is produced.

SUMMARY.

1. The muscle fibres of the iris are developed from cells of the outer layer of the secondary optic vesicle, cells which in the hinder part of the eye are known to possess a capacity for movement in the direction of light.

2. In some of the cold-blooded vertebrata the muscles of the iris have been found to react directly to the stimulus of light, apart from any nervous impulse.

3. In the warm-blooded vertebrata the direct phototactic action of the iris is lost, and becomes replaced by a more quickly acting reaction due to nervous mechanism, the afferent impulse for which is received through the retina and optic nerve.

4. That the dilator fibres of the iris in warm-blooded animals are not concerned in the reflex light-regulating mechanism, and that their action must have been evolved for a different purpose.

5. That these dilator fibres are supplied by the cervical sympathetic nerve which also supplies unstriated muscle fibres in the eyelid and orbit, muscles which become excited into action in connexion with the emotion of fear.

6. Enlargement of the pupils, increased prominence of the eyeballs, and widening of the palpebral fissure increase the range of circumferential vision, thereby assisting an animal in perceiving the early approach of danger and in obtaining safety in flight.

7. Consensual reaction of the pupils to light is of assistance in stereoscopic binocular vision, in which impressions received from the retinæ of the two eyes become superimposed on the same side of the brain. It is only met with in the higher mammals, in which semi-decussation takes place at the optic chiasma.

8. The reaction of the pupils in association with accommodation and convergence has been evolved much later, and quite independently, of their reaction to light. In it the two involuntary acts of contraction of the sphincter of the iris and of the ciliary muscle become associated with the voluntary one of convergence, which is represented by centres in the visual cortex.

9. Convergence can only take place in mammals where the eyes are situated in the front of the head, and where the optic axes are parallel in direction. It only becomes a pronounced feature in man and monkeys in whom a high degree of central acuity of vision has been acquired.

10. Correlated with the increasing diversity of actions of the sphincter muscle of the iris there is an increased functional specificity of the cells of the third nerve nucleus.

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ON THE RELATION BETWEEN GENERAL PARALYSIS AND SOMATIC SYPHILIS.*

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WHAT is it that in a relatively small number of cases causes the *Spironema pallidum* to invade the nervous system? To obtain an answer to this question is the object of our work.

Two possibilities present themselves: First, that the controlling factor lies in the organism itself or, in other words, that a neurotropic strain of spirochæte exists; secondly, that tissue predilection is the deciding factor, and that the nervous system is infected because it offers less resistance to the invading organism. It is well known that the tissues of certain individuals wear out more easily than do those of others. A nervous system having what is termed by Bolton[1] this "defective durability," is liable, when invaded by an organism such as the spirochæte, to fall a prey to it.

Our original question is not a mere academic one, and the correct answer will prove of immense importance in practical medicine. For this reason the research is of general interest. General paralysis is chosen as our type of neuro-syphilis because the diagnosis by modern serological methods is certain and can be confirmed by exactly determined post-mortem findings; also because it is the only disease of this nature concerning which adequate pathological details in sufficient number could be collected.

Neuro-syphilis may be divided into two varieties: (1) The meningo-vascular type, where the supporting structures are primarily affected and the nervous tissue only secondarily. Examples are gumma and gummatous meningitis at one end of the scale, and purely vascular lesions, such as cerebral softening and so-called myelitis, at the other. Between these two lie the intermediate forms which may be classed generally as disseminated cerebro-spinal syphilis. It is contended by us that this meningo-vascular type is not in the anatomical sense *neuro*-syphilis at all, but rather merely a syphilitic invasion of those nutrient and supporting structures which are necessary for the functioning of the nervous system. (2) The variety in which the attack falls upon the nervous tissue proper, so-called parenchymatous neuro-syphilis, of which general paralysis and tabes are the only representatives.

If there be a special neurotropic variety of spirochæte responsible for general paralysis either it should attack the nervous system only, or, if it does attack the somatic system, then the findings here should be slight, or at any rate different from those found in non-nervous syphilis.

A study of the Wassermann reaction in cases of general paralysis led us to assume at the outset that somatic lesions would be found, for in all the samples of blood in these cases examined by us without exception a strongly positive reaction was obtained. If this means that the body tissues contain living spirochætes or their products, then the matter

* A paper read before the Liverpool Medical Institution.

resolves itself into a search for these lesions, knowing that they must be present.

Analysis of Post-mortem Records of General Paralysis.

The first part of the research consists of the analysis of the records of post-mortem examinations upon cases of general paralysis made by one of us (G. A. W.) at the Lancashire County Mental Hospital, Rainhill. Out of a total of 2622 autopsy records there were 529 cases of general paralysis; 1485 of the 2622 autopsies were upon male and 1137 upon female cases. The 1485 male cases provided 429 examples of general paralysis, a percentage of 28·9; the 1137 female cases provided 110 examples, a percentage of 9·6 total female autopsies. This last figure is striking, showing as it does that the disease in this institution is only about three times more common in men than in women; this is a very much lower ratio than that usually given. In addition to these cases there were records of two male and nine female juvenile paralytics.

For the purposes of this research in order to maintain a uniform standard only those records made by one of us (G. A. W.) were used—viz., 424 male and 105 female cases. In a few it had only been possible, for various reasons, to make a partial examination, but in all the skull and brain had been examined. All the cases had been proved by examination of the brain to be undoubted cases of general paralysis, and in several the spirochæte had been demonstrated in the brain substance. No reference is made here to the pathological findings with regard to the brain and nervous tissue, as the object of our work was to discover, by examination of cases known to be general paralysis, any evidence for or against the theory that a special variety of spirochæte is responsible for neuro-syphilis.

As post-mortem findings vary with the age of the subject, we first analysed the cases with regard to the age at death. (Table I.)

TABLE I.—*Age Incidence at Death.*

Age period.	Males.	Females.	Age period.	Males.	Females.
20–25	4	0	51–55	40	11
26–30	21	5	56–60	28	5
31–35	67	11	61–65	6	1
36–40	101	26	66–70	5	0
41–45	81	27	70–75	1	0
46–50	72	19	Age unknown.	2	—

The average age at death of 426 males was 42·6 years, while that of 105 females was 42·4 years. These figures show that the largest number of males die between the ages of 36 and 40 years, the figure for this period being considerably higher than that for the age period 41–45, whereas in women the percentage death-rate for these two periods is practically the same. The average age at death, however, shows remarkable agreement.

Next our attention was directed to the records dealing with evidences of syphilitic infection on the external surface of the body with the following results:—

(*a*) Well-defined scars of the primary sore were found in 81 of the male cases, indefinite scars in a further 23, and inguinal scars in a further 6 cases, making a total of 110, a percentage of 26. This figure, so far as our observations go, is considerably higher than that found in the venereal department records, and it is particularly interesting in view of the oft-repeated statement that general paralysis frequently occurs in those individuals who never knew that they had been infected with syphilis.

(*b*) Pigmented scars on the legs were found in 36 male cases, and in only three of the females.

(*c*) Another extraordinary finding, which has no direct bearing on the present question, but which is of sufficient interest to warrant its mention, is the incidence of elaborate tattooing in these cases. Of the 424 male paralytics 102 were thus adorned, a percentage of 24, whereas the percentage of cases showing tattooing among 899 other male lunatics was only 6·2. Of the 105 women paralytics the incidence of tattooing was 5·9 per cent., while in 1032 other female lunatics only four showed this (0·38 per cent.). The tattoo marks in the female non-paralytics were simple initials only, and among the males those found in the non-syphilitic cases tended to be of a much simpler type.

Statistics concerning the condition of the skull revealed an increase in density in the large majority of the cases examined. The typical paretic skull is much thicker and harder than normal, with a disappearance of the diploë and its replacement by solid bone. Well-defined symmetrical bossing of the frontal bones was noted in a few instances, while a roughening or corrugation of the inner table of the frontal bone, together with a deepening of the groove for the middle meningeal artery, were fairly typical findings. Much rarer were irregular areas of cranial thinning. (Table II.)

TABLE II.—*Statistics as to the Condition of the Skull.*

Condition.	Male.	Female.
Normal	45	10
Density increased	59	17
Density much increased	174	44
Density very much increased	124	28
Density extremely increased	12	5
Bosses	11	6
Paget's disease	0	1

Most important changes were found in the cardio-vascular system. The aorta in all but seven cases showed some pathological change, the condition found in 392 instances being syphilitic aortitis, apparently exactly similar to that met with in somatic syphilis. This aortitis is characterised by the presence of comparatively large raised areas of pearly-white fibrosis, in which later contraction takes place, resulting in very typical radiating scars. The pearly nodules contain no fat, they do not ulcerate, and no lime salts are deposited in them. The patches occur first and are usually most marked in the first part of the thoracic aorta, in this way differing from ordinary atheroma which begins, and is most marked, in the descending part of the thoracic and in the abdominal aorta. The pearly-white patches occur in quite young persons; in our series they were found in all of the 18 cases between 21 and 30 years of age. In the older subjects it is common to find ordinary atheroma with ulceration and calcification associated with the syphilitic condition. This is due to the other causes of arterial degeneration coming into action. We have, therefore, tabulated (Table III.) the aortic condition into three classes: (1) Pearly patches only; (2) pearly patches with ordinary atheroma; (3) ordinary

TABLE III.—*Showing the Condition of the Aorta in G.P.I. at the Different Age Periods.*

Age period.	Aorta normal.	Extent.	Pathological change.		
			Pearly patches.	Pearly patches & atheroma.	Atheroma only.
21–30	1	P.	10	0	0
		M.	5	0	0
		V.M.	3	0	0
31–40	2	P.	48	0	5
		M.	37	1	1
		V.M.	48	1	3
41–50	4	P.	23	1	4
		M.	25	3	3
		V.M.	71	12	1
51–60	0	P.	10	0	1
		M.	9	2	1
		V.M.	27	18	2
61–70	0	P.	1	0	0
		M.	2	0	0
		V.M.	5	3	0
75	0	V.M.	0	0	1
Total	7		324	41	22

P. = Present. M. = Marked. V.M. = Very marked.

atheroma only. As there were no essential differences in men as opposed to women in this series the figures have been added together. It is extraordinary that there were only seven normal aortas in the whole series, and of these four were in men between the ages of 41 and 50.

We were struck by the unexpected finding that the incidence of aneurysm is rare. Though slight dilatation of the aorta is fairly common, being found in 30 of our cases, there were only two saccular aneurysms and one of the fusiform variety. Of the saccular aneurysms one was in a woman who died from its rupture. It is remarkable that though the first part of the aorta is affected in these cases the heart valves usually escape. In this series the valves, usually the mitral, were thickened in 22 cases, and showed ordinary atheroma in nine cases only. One of us (G. A. W.) has demonstrated spirochætes in the aortic lesions in cases of general paralysis. Another remarkable fact is that true endarteritis obliterans is rarely found in the cerebral arteries in these cases, the common change being a thickening or wiry condition of the smaller arteries. We have analysed the condition found in our series into three classes: (1) Those showing increased density of the smaller arteries; (2) those showing a fibrous nodular condition; and (3) those showing ordinary arterio-sclerosis only. Thirty-two males and thirteen females only had normal cerebral arteries. (Table IV.)

TABLE IV.—*Showing Condition of the Cerebral Arteries in G.P.I.*

1. Increased density of smaller arteries.		
Some increase	159 males,	31 females.
Marked increase	113 ,,	28 ,,
Very marked increase ..	45 ,,	13 ,,
2. Arteries show fibrous nodules.		
Present	39 males,	4 females.
Marked	25 ,,	5 ,,
Very marked	5 ,,	3 ,,
3. Arteries show ordinary arterio-sclerosis.		
Present	16 males,	3 females.
Marked	11 ,,	3 ,,
Very marked	9 ,,	2 ,,
Extremely marked ..	1 male,	0 ,,
Arteries normal	18 males,	13 ,,

Examination of the internal organs revealed certain pathological conditions. The spleen, kidneys, suprarenals, and liver showed an increase in the amount of fibrous tissue present. This increase takes the form of a diffuse fibrosis, so that the organ feels harder and heavier than normal. This change is most marked in the spleen, less so in the kidneys, and least of all in the liver. The typical changes in the kidneys will not be confused with ordinary cirrhosis, for it occurs in much younger persons, its distribution is different, and it is not associated with the presence of small cysts. It is peculiar that in the livers examined no scarring, such as is so common in syphilitic cases in general hospitals, was noted. In many of the cases, especially those which had an associated tuberculosis, the liver was fatty; in spite of this an increased fibrosis was obvious in many of them. Marked fibrosis is common in the testicle, but we have no exact figures as to the numbers.

Details of Fibrosis of the Solid Organs.

The degree of fibrosis was divided into four groups—viz., slight increase (+), distinct increase (++), great increase (+++), very great increase (++++). (Table V.)

Though it may be regarded as a pathological axiom that syphilis produces fibrosis, yet it is common knowledge that with advancing age the density of the tissues may increase from various causes. In order to determine whether the age at death had any relationship to the density of the fibrosis, we have tabulated (Table VI.) the various degrees of fibrosis in the different age-periods.

TABLE V.

Organ.	No. examined.	Normal.	Degree of increase of density.					Other conditions.
			+	++	+++	++++	Total	
Spleen (M.)	316	1	15	80	185	30	310	5
(F.)	83	0	7	28	41	4	80	3
Kidneys (M.)	316	3	6	52	160	78	296	17
(F.)	83	2	8	17	40	11	76	5
Liver (M.)	316	3	46	104	123	18	291	22
(F.)	83	2	12	30	14	3	59	22

M. = Males. F. = Females.

TABLE VI.—*Density of Fibrosis of Solid Organs at Different Age-Periods (Males).*

Organ.	Age-period.	Fibrosis. No. of cases.	Amount of fibrosis.			
			+	++	+++	++++
Spleen ..	–20	1	0	0	1	0
	21–30	18	0	4	13	1
	31–40	117	4	30	66	17
	41–50	110	5	30	68	7
	51–60	53	3	12	34	4
	61–70	10	2	4	3	1
	Over 70	1	1	0	0	0
Kidneys ..	–20	1	0	0	1	0
	21–30	18	0	0	11	7
	31–40	112	1	14	57	40
	41–50	105	0	26	58	21
	51–60	51	3	10	28	10
	61–70	9	2	2	5	0
	Over 70	0	0	0	0	0
Liver.. ..	–20	1	0	1	0	0
	21–30	18	1	4	12	1
	31–40	109	12	39	51	7
	41–50	105	21	36	43	5
	51–60	49	10	21	14	4
	61–70	8	2	2	3	1
	Over 70	1	0	1	0	0

A perusal of Table VI. clearly shows that the age of the patient has no relation to the amount of fibrosis present—for example, 72·2 per cent. of the cases between 21 and 30 years of age had a +++ fibrosis of the spleen, and 64 per cent. of those between 51 and 60. While in the case of the kidneys 61·1 per cent. between 21 and 30, and 54·9 per cent. between 51 and 60 had a +++ fibrosis. This is in accordance with the findings of other observers who have described marked fibrosis in early cases of general paralysis dying from some intercurrent disease. These results also go to disprove the theory that the fibrosis is not due to the syphilis, but to the associated septic conditions which frequently occur at the termination of long-standing illness. Other syphilitic lesions found were—four instances of gummata of the testes, kidney, spinal ganglion, and brain, the last being in a woman; three cases (two men and one woman) of syphilitic meningitis, and one female case of syphilitic osteitis. Interstitial keratitis was fairly common.

With regard to the presence of associated pathological conditions, it is interesting to note the relative frequency of tuberculosis. Ninety-seven (30 per cent.) of 324 complete male, and 32 (38·5 per cent.) of 83 complete female autopsies showed evidence of this disease. (Table VII.)

TABLE VII.—*Tuberculous Lesions in Cases of G.P.I.*

	Males.	Females.
Active T.B. of the lungs ..	20	19
Old T.B. of the lungs	75	13
T.B. ulceration of the intestines	8	6
T.B. Fallopian tubes	—	6
T.B. pancreas	1	0
Acute pneumonic phthisis	1	0

Eighty-four of the cases died of pneumonia, and in 14 of these gangrene of the lung had supervened. This percentage of gangrene appears to be much higher than that found in ordinary general hospital

practice. Concerning the other organs, little remains to be said, but one further fact is worthy of note. As compared with the genital scars in the males and the evidence they provide of old venereal infection, a study of the Fallopian tubes in women paralytics is of interest. Of the 83 complete female post-mortem examinations, 57 showed old tubal adhesions, a percentage of 68·7; a few of these were undoubtedly tuberculous, but apparently venereal disease was responsible for the majority. The percentage of old tubal adhesions among the ordinary asylum female population is placed at 12.

It will be remembered that this study of the post-mortem findings was undertaken with the object of discovering what, if any, signs of somatic syphilis were present in cases of general paralysis, in order to support or disprove the theory that this disease is due to a special strain of spirochæte which attacks the nervous tissues only. It has been asserted that the cases which develop general paralysis often have had very slight clinical signs in the primary and secondary stages. One would therefore be led to expect lesions in the somatic system in cases of general paralysis to be but slight, or at any rate to be different from those found in non-nervous cases.

We have shown that somatic lesions do occur in general paralysis, that these are by no means slight, and that they differ in no marked respect from those found in syphilitic cases in general hospitals. These results are of particular interest when it is remembered that although attention has been drawn to the subject by Bolton, in other modern text-books on neurology and psychiatry but scanty mention is made of the presence of somatic lesions in this disease.

Comparison between Syphilis among the Asylum Population and that in the General Community.

The next section of our work deals with the incidence of syphilis among the asylum population as compared with that in the general community. If parenchymatous neuro-syphilis depends upon an inherent weakness of the nervous system then there ought to be a difference in these two figures.

With regard to the incidence of syphilis in the general population a perusal of the literature shows that this is by no means easy to determine. The most extensive and probably the most accurate Wassermann surveys have been made in America, but here the presence of the coloured race complicates matters considerably. Allowance for this factor cannot always be made, since in some of the statistics the author omits to mention whether or not coloured patients were included.

Williams[2] examined clinically and serologically what he calls "a group of individuals representing the great American middle-class population." None of this group, numbering 912 persons, was known or suspected to have syphilis. The percentage of strongly positive Wassermann reactions was 4·4. Vedder[3] reports that in 1916 13 per cent. of 11,933 accepted recruits in the U.S. Army were Wassermann positive, as also were 15 per cent. of 856 candidates for the police force in Washington, and about 5 per cent. of 3203 candidates for commissions in the army. It would appear that in the same locality 5·8 per cent. of hospital admissions showed serological evidence of syphilis. Warthin[4] attacked the problem from a different standpoint. By necropsy study he found that 30 per cent. of bodies showed some pathological evidence of syphilis. This figure may be contrasted with that arrived at by Symmers,[5] who states that post-mortem statistics show that less than 7 per cent. of bodies reveal anatomical evidence of the disease, while in the living subject the Wassermann reaction is positive in over 25 per cent. of all persons investigated. Jeans[6] from the American literature has collected statistics among adults admitted to hospitals and dispensaries (V.D. wards excluded), and his findings may be presented in table form. (Table VIII.)

TABLE VIII.

Town.	Author.	Number of cases.	Number W.R.+	Percentage.
Baltimore ..	Walker	1,080	116	10·8
Boston	Walker and Haller	4,000	600	15·0
Chicago ..	Moore	418	56	13·4
Ann Arbor ..	Peterson	2,771	160	5·8
San Francisco	Whitney	6,995	518	7·4
	Totals	15,264	1450	9·5

The same author also quotes a Wassermann survey among married pregnant women. The figures are as follows (Table IX.):—

TABLE IX.

Town.	Author.	Number of cases.	Percentage of W.R.+
Chicago ..	Falls & Moore	116	10·6
Brooklyn ..	Comminsky	1822	8
Brooklyn ..	Judd	892	7·9
Philadelphia	Williams & Kolmer	40	7·5
New York ..	Ottenburg	2488	11·5
	Totals	5358	9·66

Rosenberger,[7] in the Philadelphia General Hospital, states that 4430 blood Wassermann reactions were made during the year 1916. Of these 24·4 per cent. were positive, but, since the hospital has a mental department attached, this figure is probably too high for our purpose.

Much work appears to have been done on the frequency of hereditary syphilis. Perhaps in this connexion the following quotation will suffice: "The amount of hereditary syphilis among the hospital infants and children in four large cities of U.S.A.—New York, St. Louis, San Francisco, and Chicago—appears to range from 2 to 6 per cent." (Churchill and Austin[8]). Very thorough investigations have been carried out upon Panama Canal zone workers by Qualls.[9] The latent syphilitic infection among coloured male employees in this region is extremely high, 23·7 per cent., as compared with 2·3 per cent. among white employees. The total syphilitic infection among white surgical patients was 15 per cent., 981 blood samples being examined. Boudreau,[10] working at Auburn Prison, New York, found that 16·85 per cent. of the males and 33·85 per cent. of the females gave a positive Wassermann reaction.

Without quoting further statistics it will be evident that the percentage of syphilis among the general population is considerable. Thom[11] remarks:—

> "The incidence of syphilis in the United States, including the inherited as well as the acquired form, has been variously estimated at from 10 to 20 per cent. The former is the percentage which I believe to be approximately correct in the white race. In the negro I believe the percentage to be much higher, approximately 30 per cent."

Jeans[6] thinks a figure of 20 per cent. is probably nearer the truth.

Assuming, then, that the incidence of syphilis among the general population is approximately 10 per cent. we now pass to the study of the same problem among asylum inmates. For this purpose the blood and spinal fluid of every new admission to the Lancashire County Mental Hospital, Rainhill, during a period of almost a year were examined by us. Of the 305 cases examined 47 were clinically general paralytics, the diagnosis being confirmed serologically in 42. Of the 258 non-syphilitic psychoses 11·7 per cent. gave a positive Wassermann reaction. The total percentage of syphilis in this institution was, therefore, 23·6, and the figure 11·7 per cent. may be taken as representing the incidence of the disease among the non-paralytic asylum population.

It is interesting to compare these figures with those obtained in similar institutions in America. Fell,[12] working in the Elgin State Hospital, found a positive Wassermann reaction in 15·7 per cent. of 1266 consecutive admissions. Excluding the syphilitic psychoses the figure obtained by him dropped to 4·8 per cent. Lowrey[13] examined 1600 unselected admissions to Danvers State Hospital, and found that 16 per cent. gave a definitely positive and 3·8 per cent. a doubtfully positive Wassermann reaction. Of Holbrook's[14] 1153 white patients in the East Louisiana Hospital for the Insane only 6 per cent. of the bloods reacted positively, while amongst 447 negroes a figure of 9 per cent. was registered. Flashman and Latham[15] have studied the same problem amongst idiots and imbeciles. At Newcastle Hospital they obtained 9·8 per cent. of positive reactions (436 cases examined). Interesting quotations are to be found in this paper dealing with similar cases in other areas. (Table X.)

TABLE X.

	Cases.	Per cent.
Robiart and others	246 ..	30·8
Kellner and others	216 ..	7·4
Liepmann	78 ..	9·0
Dean	330 ..	15·4
Dalldorf Asylum	— ..	13·2

It is to be regretted that, with the exception of Fell, these authors do not draw a distinction between the paralytic and non-paralytic elements of the asylum population. In Fell's work the figure (4·8 per cent.) for Elgin State Hospital (general paralytics excluded) is distinctly below the average. At Rainhill Mental Hospital we obtained a figure of 11·7 per cent. At first sight, if the "defective durability" theory be true, one would expect to find the incidence of syphilis in mental hospitals, when the general paralytics are excluded, to be practically nil, except for comparatively recent infections in young subjects; for every individual who is a potential lunatic should, if he contracted syphilis, become a general paralytic. Further consideration of this question, however, must lead to the view that it is not every potential lunatic who is likely to develop general paralysis, but only one whose mental weakness takes the form of a tendency to dementia—such a person has been called by Bolton[1] a "dementable psychopath." Should a person belonging to this group of dementable psychopaths acquire syphilis he should develop general paralysis. Therefore, the incidence of syphilis among cases of dementia, other than dementia paralytica, in any asylum should be much lower than that among other asylum inmates or in the general community.

In order to test this hypothesis we examined the blood with regard to the Wassermann reaction in 198 cases of secondary dementia at the Lancashire County Mental Hospital, Rainhill. Of these 198 cases seven gave a positive reaction, a percentage of 3·5; this figure is low as compared with that for the general asylum population (11·9) and gives support to this theory.

Facts Collected from the Literature.

The last section of this paper deals with facts germane to the subject which have been collected from the literature, but have not, as yet, been confirmed by us. Bolton[1] has published very careful work on this subject. He states that—

"The ordinary sane individual and the ordinary psychopath or potential lunatic who possesses cortical neurones of average durability may suffer from syphilis with impunity as regards the onset of dementia paralytica; and I should express the same opinion with regard to syphilised lunatics with little or no dementia, who are fairly common in asylums. On the other hand, I think that a psychopath, who possesses cortical neurones of subnormal durability, and who apart from an attack of syphilis would develop a moderate grade of dementia, . . . would on acquiring this disease be liable sooner or later to suffer from one or other of the types of dementia paralytica."

In order to prove this contention Bolton investigated the question as to whether or no insanity or family degeneracy is to be found in the parents or relatives of general paralytics. He collected the family histories of 85 cases. He summarises his results as follows:—

"Of the cases 13 were private and 72 rate-paid patients. In eight of the 13 private cases there was direct or collateral insanity; in three more there were allied disorders, including epilepsy; in the twelfth the father died of cerebral hæmorrhage and the mother of paralysis . . .; and in the thirteenth the mother and sister died of phthisis, a brother was delicate, and 11 out of 14 in the family were dead. . . . Of the 72 histories of rate-paid patients, there was psychopathic heredity in no less than 81·9 per cent., and an abnormally high family death-rate in another 9·7 per cent."

These findings certainly appear to lend support to the defective neuronic durability theory.

On the other hand, evidence in favour of the neurotropic theory is gathered from a consideration of statistics of neuro-syphilis incidence among certain races. Lennox[16] showed that in China syphilis is three times more common than in America, whereas the incidence of neuro-syphilis is extremely rare; and, moreover, that those cases which do show signs of neuro-syphilis are usually sailors who have been infected from European sources. In our series of cases there were 13 Chinamen, eight of whom were general paralytics. Christidi[17] has shown that among 3000 cases of syphilis in Persia general paralysis was not found once, although the Persians are intellectual workers and use alcohol and opium. Further, Europeans infected by Persians show the same immunity to neuro-syphilis; but of 22 Europeans infected by non-Persian women two developed general paralysis.

Against this should be placed the figures derived from a study of conjugal general paralysis and tabes. Drysdale[18] analysed the literature up to the year 1916 in this respect, and was only able to collect 44 published cases where man and wife were both infected with parenchymatous neuro-syphilis. So far as we could gather two such instances occurred in our series.

Another argument against the neurotropic theory is the fact that general paralysis is relatively uncommon in women. If there were a neurotropic strain of spirochæte one would expect a larger number of female cases, since it may be assumed that probably every syphilitic man runs the risk of infecting at least one woman. The same argument is applicable in the case of the children of general paralytics in whom congenital somatic syphilis is very common and yet neuro-syphilis is rare. It should be mentioned, however, that in the records of a series of juvenile paretics numbering 12, one of the parents died of general paralysis in two instances (Watson[20]).

It is difficult to understand how a special neurotropic variety of spirochæte, having its only habitat in the nervous system, can enter another host. But that this is not necessarily true is suggested by the work of Moore and Kemp,[19] who state:—

"Although the danger of infection for the spouse increases as the date of infection of the one acquiring syphilis approaches the year of marriage, it is shown that neurosyphilitic patients may be infectious for many years in spite of the absence of demonstrable open lesions."

Many classical examples are found in the literature of instances of one woman infecting many men in all of whom a similar parenchymatous neuro-syphilis has resulted. These observations provide one of the most important planks in the platform of the neurotropic school. On the other hand, just as many, or more, instances are found in the literature where several members of the same family, infected at widely different times by different women in different countries, have all developed the same variety of parenchymatous neuro-syphilis. These observations

favour the defective durability hypothesis, since such a weakness would naturally occur in several members of the same family. Finally, in this connexion we can find no evidence in support of Mott's contention that social class or type of work play a part in the causation of parenchymatous neuro-syphilis.

The results obtained by bacteriologists, which ought to have been the most weighty of all, are, unfortunately, most indefinite. Ever since Noguchi, about 1912, first cultivated the *S. pallidum* many attempts have been made to differentiate strains of the organism depending upon morphological and cultural characteristics and behaviour on inoculation. Some evidence has resulted suggesting that dermotropic and neurotropic strains of the virus exist, but many difficulties have been encountered.

In conclusion, ample evidence of the presence of somatic lesions in general paralysis has been given. These lesions appear to differ in no essential particular from those found in any other form of syphilis, and therefore this fact may be taken as militating against the neurotropic theory of the disease. Support of the defective durability theory is gained by consideration of the family history of general paralytics in respect of hereditary mental weakness, by the death incidence tables of Bolton, and by instances of several members of the same family infected by different persons all developing the same type of parenchymatous neuro-syphilis. If not for this theory, at any rate against the neurotropic school, is the comparative rarity of conjugal general paralysis and tabes.

The evidence concerning syphilis in China and Persia, the examples of dementia paralytica and tabes contracted by different persons from the one source, and the bacteriological evidence, such as it is, favour the neurotropic school. We are of the opinion that the weight of the evidence is in favour of the defective durability hypothesis, whether or not a neurotropic strain of spirochæte exists.

There only remains the pleasant duty of offering our sincere thanks to Dr. E. F. Reeve and the staff of Rainhill Mental Hospital for their enthusiastic support and for their great kindness in collecting a large number of samples under the most difficult and trying conditions. Our thanks are also due to Prof. Ernest Glynn, of Liverpool University, who has given us constant helpful advice and encouragement during this work.

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BLOOD-PLATE COUNTS IN PULMONARY TUBERCULOSIS.

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THE relation of blood-plates to microbial infection has been made apparent from a number of different aspects. Bull[1] has shown that the injection of certain bacteria into the circulation of animals is followed by their agglutination and disappearance, and Delrez and Govaerts[2] found that this agglutination is occasioned by the blood-plates. That a diminution of the number of plates is associated with a lowering of the resistance to infection has been proved by Cramer, Drew, and Mottram,[3] who found that thrombopenia could be induced by vitamin-A starvation or appropriate exposure to radium or X radiation, and was associated with a tendency to the development of infective conditions. In the human subject the writer has observed a thrombopenia during acute infection. The following record shows that in pulmonary tuberculosis—a chronic disease—the blood-plate picture is very different, the tendency being to a thrombocytosis.

Technique.

The method described in a previous paper[4] has been greatly improved and simplified as a result of suggestions made by Dr. L. Colebrook. The finger is pricked through a droplet of the diluent with the ragged end of a teated glass pipette whose interior is lined with paraffin: the blood-diluent mixture is then emptied on to a paraffined slide where it is thoroughly mixed by being sucked to and fro by the pipette, and if necessary further diluted: a suitable quantity of a suitable dilution is then placed on a slide, covered, and sealed. In order to conserve a uniform relative distribution of plates and red corpuscles it is essential to carry out the manipulations with rapidity.

Sixty-five cases of pulmonary tuberculosis have been examined in this way; these were unselected but have been rearranged in the table in categories according to the number of plates found; it is believed that the experimental error does not exceed 10 per cent., and in many cases the figure given is the mean of two or more counts. In a series of normal subjects the plate count was found to vary from 250,000 to 380,000 per c.mm., the average being 300,000. All the observations were made at an altitude of 5000 feet, where the normal red corpuscle count is in the region of 6,500,000 per c.mm. The clinical remarks do not aim at any degree of completeness, but are rather intended to give some impression of the cases from a general point of view, with special reference to prognosis: the temperatures (T.) mentioned are Fahrenheit and rectal. G.C. refers to the general condition as evidenced by weight, exercise tolerance, and appetite. Treatment by artificial pneumothorax is denoted by A.P.

Discussion.

It is apparent that the blood-plates are generally present in excessive numbers in active pulmonary tuberculosis, and that, broadly speaking, the more serious the clinical condition the greater is the degree of thrombocytosis. All the fatal cases in the series are to be found in Category III. In some cases, where repeated counts have been made at intervals, a change in the number of plates has occurred—e.g., Nos. 35, 38, 60, 65. When this change is in the direction of the normal, it has coincided with an improvement in the clinical condition, whereas a movement in the opposite direction, or the persistence of a high plate count, has been associated with progression of the disease. On the other hand, the maintenance of a normal plate count points to stability. More prolonged observation is required to determine the more precise relations between thrombocytosis and the stage of the disease, but it is already apparent that there is no necessary correspondence between the number of plates and such features as pyrexia, the anatomical extent of the

TABLE SHOWING RESULTS OF BLOOD-PLATE COUNTS.

Category I. Plates 400,000 per c.mm. and under.

Case No.	Red corpuscles. Reckoned in thousands per c.mm.	Plates.	Clinical remarks.
4	5900	310	Small chronic apical lesion; no sputum; no toxæmia.
	6660	260	3 months later; returning to work.
6	6000	340	Chronic pleurisy; slight pyrexia at times. Later history of complete recovery.
7	5900	310	Fibrotic lesion of many years' standing; no pyrexia.
15	7000	390	Physical signs of activity; occasional hæmoptysis; persistent slight fever.
	7000	410	5 months later; observation made during "autoinoculation"; physical signs similar.
	7500	350	12 months later: A.P. established for 6 months. T. normal. Much improved, and improvement continued to present (4 months later).
16	5900	390	Chronic fibroid. Occasional slight pyrexia. G.C. good.
17	6000	320	Chronic fibroid; large cavity; occasional hæmoptyses. T.B. in sputum. G.C. very good.
18	5600	270	Fibrotic lesion of long standing; no fever; at work.
19	6100	300	A.P. now quite stable for 3 years; at work.
23	5700	360	Chronic fibroid: T. normal. G.C. very good; well and working 8 months later.
24	6660	310	Also tuberculous laryngitis, now healed; general condition much improved.
25	6700	340	Inactive circumscribed lesion; no pyrexia.
27	7200	400	Early; rapid response to sanatorium conditions; continues well now, 4 months later.
28	6600	300	Early, inactive; G.C. extremely good and remains so now, 4 months later.
29	6200	400	Extensive, chronic; long-continued slight fever, gradually settling. G.C. excellent. Continues well now, 8 months later.
30	5600	270	Chronic, circumscribed; T. normal. Now working, 4 months later.
33	5400	420	Bilateral activity; slight pyrexia.
	5900	380	6 months later; much improved; gain in weight; no pyrexia; continues well and working now, 5 months later.
34	4320	330	Very active; much sputum, containing T.B. Prognosis apparently very bad. T. 101°, but after A.P. now very well, 11 months later.
40	5100	360	Early, localised, febrile; confined to bed.
	6100	370	2 months later; now up. T. normal. G.C. very good.
45	6100	270	Chronic, fibroid, bronchitic. G.C. excellent. T. normal. T.B. found constantly in sputum.
48	6500	240	Widespread, recently active; now apparently well.
50	6500	260	Chronic apical lesion; T.B. once found in sputum. T. normal. G.C. excellent.
51	6700	370	Chronic small lesion; frequent slight hæmoptyses. T. normal.
	6700	360	2 months later; hæmoptyses ceased. G.C. better.
53	6000	320	Chronic bilateral lesion, probably of many years' standing; slight fever which rapidly settled, and G.C. now much improved 1 month later.
55	7200	320	History of bilateral pleurisy; physical signs slight. T. normal. G.C. excellent; continues well 1 month later.
59	6000	320	Early, afebrile; improving in G.C. and physical signs.
62	6100	390	Early apical lesions; rapid response to sanatorium conditions.
63	5800	270	No physical signs; X ray shows hilar shadows; probably very old. T. normal.
64	5300	370	Bilateral apical lesions, probably of long standing. T. normal.

Category II. Plates 410,000 to 500,000 per c.mm.

Case No.	Red corpuscles. Reckoned in thousands per c.mm.	Plates.	Clinical remarks.
1	6400	430	Chronic, with tuberculous laryngitis; continuous slight fever; well nourished; unstable.
8	5100	500	Early, signs of activity; but afebrile; loss of weight.
9	5300	470	Active, bilateral disease, with bronchitis and tuberculous laryngitis. Continuous slight fever.
11	4700	450	Chronic fibroid, with much dyspnœa; occasional febrile attacks.
22	7000	430	Signs of quiescent disease; afebrile; well nourished.
	6500	350	One month later: improvement.
26	4500	450	A.P., but probably contralateral activity. Continuous pyrexia—e.g., T. 100°.
41	7700	500	A.P. pleural effusion. T. normal. T.B. in sputum.

Category II. (continued).

Case No.	Red corpuscles. Reckoned in thousands per c.mm.	Plates.	Clinical remarks.
42	6100	450	Chronic bilateral, slowly progressive; little sputum.
	6400	450	Signs the same; G.C. improved 3 months later.
46	6000	440	Extensive, bilateral; very copious sputum, with T.B. and much secondary infection. Slight continuous fever; slowly deteriorating.
56	7000	440	Signs of activity; occasional fever.
57	6300	430	Old lesion at one apex, more recent infiltration of other. No pyrexia.
58	6500	450	Chronic fibroid; febrile; G.C. improving.

Category III. Plates 510,000 and over per c.mm.

Case No.	Red corpuscles. Reckoned in thousands per c.mm.	Plates.	Clinical remarks.
2	3630	520	Advanced, active, bilateral disease; continuous fever—e.g., 101°. Died 3 months later.
3	5800	550	Chronic, recently more active; also epididymitis and fistula: continuous slight fever. In same condition 4 months later; further history not known.
5	5100	700	Short history; very rapid evolution. Continuous fever—e.g., 102°. Died 6 weeks later.
10	5400	800	Young girl, with rapidly advancing disease. Continuous fever—e.g., T. 101°. Died 7 months later.
12	5400	570	Rapid, active, continuous fever—e.g., T. 100°. Died 6 months later.
13	5400	600	Active, febrile, prognosis bad.
	5900	510	5 months later: physical signs of activity continue, but T. now normal and G.C. improved.
14	6000	790	Short history; active evolution; irregular, but always high, fever, sometimes inverted; died 2 months later.
20	6400	920	A.P. abandoned because of contralateral activity; slight fever—e.g., T. 99·8°. Losing weight.
	6100	770	1 month later; T. more nearly normal; physical signs the same; loss of weight continues; in same condition 3 months later.
21	6000	510	Active, spreading; T. 101°. Later history not known.
31	4800	770	Young girl; active, bilateral. Colitis; emaciated.
	3900	780	2 months later: condition worse. Died 4½ months later.
32	3900	870	Very active; bilateral. Copious sputum. Continuous high fever—e.g., T. 101°. Died 3 months later.
35	6500	680	Chronic fibroid; much sputum, with secondary infection. In bed with fever—e.g., T. 101°.
	6900	780	8 months later; "flare-up" succeeding overexercise.
	7100	490	2 months later: after further confinement to bed. T. now settled, but condition unstable.
36	5800	770	Short history: signs only of moderate activity, but continuous fever—e.g., T. 100°. Died 2 months later.
38	6660	720	Active, bilateral. Very slight fever—e.g., T. 99·2°. Prognosis apparently bad.
	6300	390	7 weeks later: much improvement after rapid response to sanatorium conditions. Afebrile.
	6000	380	2 weeks later: improvement continues.
39	7200	520	History of 2 years, recently much more active. Reported alive but very ill 3 months later.
43	5200	790	Extremely rapid, bilateral. Also tuberculous laryngitis; continuous but irregular pyrexia. Prognosis bad.
	6100	790	2 months later: continues gravely ill. Died 4½ months later.
44	5900	660	Physical signs of activity, fever, little sputum.
	5800	620	2 months later: condition stationary.
47	5800	1380	Advanced bilateral disease in rapid evolution, but slight pyrexia—e.g., T. 99·3°; prognosis very bad; later history unknown.
49	5000	570	Bilateral disease, one side in active evolution.
	5600	510	1 month later: in same condition.
52	7100	590	Chronic fibroid; occasional pyrexia. G.C. good, but intolerant of exercise.
54	6100	570	Apparently early disease; no pyrexia.
	6900	480	Improvement in physical signs and gain of weight.
60	6660	620	Bilateral activity; pyrexia—e.g., T. 100·5°.
	6200	480	1 month later: no pyrexia; improvement.
61	6700	520	Chronic, bilateral; recently more active. Continuous slight fever.
65	7200	750	Extensive, active disease; no pyrexia.
	6300	800	1 month later: clinical condition apparently the same.

disease, or the presence of tubercle bacilli in the sputum. It appears rather that there exists an inverse relation between thrombocytosis and the subject's resistance to the disease; it is suggested that the plate count may afford a means of measuring that somewhat indefinite entity, which is the basis of prognosis.

It cannot be considered that the class of phenomena being discussed is peculiar to pulmonary tuberculosis, nor has the question of secondary infection been taken into special account; possibly the feature of chronicity plays a part, seeing that in the few cases of acute infections that have been examined a thrombopenia has been found. Comment may be made on the fact that in many advanced cases the number of red corpuscles—even when the effect of altitude has been discounted—has maintained a high level; their number is therefore evidently of no value in prognosis.

Thanks are to be recorded to Dr. Bernard Hudson, under whose care these patients were, and to the Medical Research Council, under whose direction the investigations were carried out.

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OBSERVATIONS ON BLOOD PLATELETS IN ANÆMIAS AND ACUTE DISEASES:

THEIR NUMBER AND MORPHOLOGY.

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SEVERAL workers in America and on the continent —Duke,[1] Wright and Kinnicut,[2] Gram,[3] Buckman and Habiser,[4] Degkwitz,[5] Aynaud [6]—have made platelet counts in the various blood diseases and in acute infections. Their findings have varied somewhat, but on the whole there is a consensus of opinion. During the past year these investigations have been repeated on such suitable cases as presented themselves at the Royal Victoria Infirmary, Newcastle-on-Tyne, and later at the East London Hospital for Children, Shadwell. In addition to numeration of platelets an attempt was made to study their morphology and also to find out, as has already been tried, whether there was any correlation between the platelet count, bleeding time, and coagulation time.

Technique of Platelet Count.

The red cell platelet ratio is determined in a drop of blood exuding from finger or ear into a diluting fluid composed of 2 per cent. sodium citrate, 0·7 per cent. saline, and 0·5 per cent. formalin, in distilled water. (For details see Bedson, *British Journal of Experimental Pathology*.[7]) In adults it is best to prick the finger at the root of the nail through the diluting fluid, but in young children who are restless, and moreover have small fingers, it is advisable to put a drop of the fluid on the lobe of the ear and prick through it. After a certain amount of practice, necessary to become familiar with the technique, this method gives reliable and consistent results. In passing, one might mention that the red cell platelet ratio, as estimated from ordinary blood films, is fallacious. Even an approximate estimate of the number of platelets so arrived at is frequently misleading.

Technique of Staining Platelets.

The following methods were tried:—

(1) Heidenhain's iron hæmatoxylin: Very unsatisfactory for platelets as the cell is too small to follow with the microscope the accurate differentiation which this stain entails. In preparations stained by this method one does not feel justified in stating that the platelet has or has not a nucleus.

(2) Post-vital staining with methyl-green pyronin (Chauffard et Fiessinger [8]): The platelets were stained a faint bluish red, but no detail was observed.

(3) Vital staining with neutral red (Sabin [9]): Platelets scarcely visible.

(4) Van Herwerden's method[10]: The author claims to have demonstrated nuclei in the platelets, in all grades of transition from large pale nuclei to small pyknotic nuclei, when stained either by Romanowsky or iron hæmatoxylin. Repetition of this work showed irregular darkly staining splotches in the centre of each platelet. The condition was apparently a post-mortem change in the platelet cytoplasm.

(5) Films fixed in alcohol and stained with 1 per cent. methyl green. Platelets stained a pale green colour and did not show up distinctly.

(6) *Romanowsky Stains:*—(*a*) Leishman: Platelets stand out distinctly as round or oval bodies with faint blue protoplasm in which are distributed distinct reddish-purple azurophil granules. This was the simplest and easily one of the best methods used. There is a tendency for the stain to be precipitated on the granules of the platelet and thus simulate a nucleus.

(*b*) *Panoptic Method:* Fix film in methyl alcohol five minutes. Stain Jenner (2 drops to 1 c.cm. distilled water) five minutes. Wash in distilled water. Giemsa (1 drop to 1 c.cm.) 20 minutes. Wash in water. This gives good definition of the platelets, and there is not the same tendency to overstain that there is with Leishman. Films were however, usually stained by Leishman and when necessary confirmed by this method. In the large majority of cases the preparations were made from the mixture of blood and diluting fluid, and if stained directly after being made the small trace of formalin present did not materially interfere with the result. Films made direct from the blood, if prepared with the utmost dispatch, gave quite good platelet preparations. All of the above methods were given a fair trial, but with the exception of the Romanowsky stains were found very unsatisfactory.

Morphology of the Platelets.

The morphology, as indicated by staining with Leishman or the panoptic method, showed no striking alteration in any of the cases studied. The platelets showed considerable variation in size, giant forms up to 5 or 6 μ being sometimes seen. These did not seem peculiar to any special blood condition, and on the whole no relation could be established between the variations in size and the different diseases. The large pseudopodial forms up to 30 μ and sometimes 50 μ in length, which Bunting [11] describes as constantly present in lymphadenoma, were not seen in any of the four cases examined. The granular content of the platelets also varied considerably, and seemed most abundant in cases with active bone-marrow proliferation, such as myelogenic leukæmia, and scanty in cases of severe pernicious anæmia. In some cases the granules were clumped together resembling a nucleus, but in none of the cases studied were typical nuclear forms seen.

Platelet Counts.—A series of counts were first done on normal individuals, ten being made on one and three counts each on three others. After the first few counts reasonably consistent results were obtained, with a margin of error of not more than 10 per cent. in the red cell platelet ratio. The number of platelets in adults varies normally from about 250,000 to 400,000 per c.mm. In children the counts may be higher. The counts obtained in various pathological states, more especially blood diseases, are tabulated below. In a considerable number of these the count was repeated twice and sometimes three times.

Clinical Observations.

An examination of the platelet count in the table reveals certain marked and constant changes. In purpura, lymphatic leukæmia, and pernicious anæmia the platelets are definitely diminished, whereas in secondary anæmias they are not diminished and may even show an increase. An increase of these elements would appear to be a fairly constant feature of the blood picture in myelogenic leukæmia and lymphadenoma. All the cases of myelogenic leukæmia and lymphadenoma were under X ray treatment which tends to bring down the platelet count; one of the cases of leukæmia showing a progressive fall of platelets from 1,397,000 to 518,000, coincident with

a gradual fall in the leucocytes to normal, following weekly doses of X rays over a period of about three months. It has been shown that in healthy people small doses of X rays give rise to an increase in the platelet count (Degkwitz), the red and white cells being little affected. Larger doses, however, lead to a destruction of the platelet; in fact, Fabricius Möller [12] was able to produce typical purpura hæmorrhagica, with a marked fall in the platelet count, by exposing guinea-pigs to X rays.

P.C.g.l. = Percentage of granular leucocytes.
P.C.n.-g.l. = Percentage of non-granular leucocytes.

Age.	Disease.	Red cells.	Platelets.	White cells.	P.C. g.l.	P.C. n.-g.l.
		Reckoned in thousands.				
29	Normal	5500	275	—	—	—
28		5200	371	—	—	—
18		5000	417	—	—	—
45		6000	375	—	—	—
43	Myelogenic leukæmia	3422	342	23	90	10
50	Ditto (aleukæmic stage)	5144	643	13½	94	6
64	Ditto (typical case)	3912	978	137	98	2
42	Myelogenic leukæmia	4000	446	26	89	11
25	Ditto (typical case)	1830	704	75	92	8
9	Ditto (typical case)	2784	1397	384	99	1
9	Progressive doses of X rays	2816	1126	156	99	1
		3136	784	88	96	4
		5184	518	7½	77	23
29	Hæmolytic icterus (before splenectomy)	4100	455	9½	73	27
29	Ditto (after)	4228	1123	20	67	33
37	Lymphadenoma	5100	300	7½	66	34
9		3126	1042	12	76	24
8		3260	435	8	80	20
10		5000	625	11	83	17
2½	Broncho-pneumonia	4140	548	24	78	22
13/12		4800	640	30	66	34
2		4756	375	14	69	31
1	Ditto (purpuric spots on arms and legs. Very ill.)	4876	812	25	65	35
11/12	Broncho-pneumonia	4448	148	10	57	43
56	Pernicious anæmia	2268	162	4½	64	36
57		1530	51	3½	58	42
46		2124	106	4	76	24
35		1000	28	6	52	48
18	Lymphatic leukæmia (purpuric symptoms)	2550	16	8	14	86
5	Acute purpura	2605	26	14	80	20
29	Secondary anæmia	928	293	5	70	30
46		1664	308	4	68	32
2		4400	400	23	56	44
12/52	Ditto (recurrent hæmatemesis and melæna)	5500	700	15	21	79
1/12	Cellulitis of groin	4280	428	16½	45	55
3	Congenital pulmonary stenosis	6576	328	9½	58	42
19/12	? Von Jacksch's anæmia. (Small petechial hæmorrhages on arms and legs.)	3888	20	16	54	46

Most of the cases of broncho-pneumonia showed an increase of platelets, though one case showed a definite fall. Other observers have found a preliminary fall during the onset of acute disease, followed by a rise during convalescence. Hæmorrhagic spots simulating purpura were present on the legs and abdomen of one case of broncho-pneumonia, with a platelet count of 812,000. This child was dangerously ill, and apparently suffering from severe septicæmia, so that the hæmorrhagic foci were probably due to septic thrombi in the capillaries. These findings correspond very closely with those obtained by previous workers, though Buckman and Habiser report one case of lymphatic leukæmia with normal platelet count and bleeding time. Generally speaking, an increase of platelets is associated with an active proliferation of bone marrow, a diminution of these elements being associated with bone-marrow failure. The marked increase of platelets after splenectomy, which has also been shown experimentally by Bedson (findings as yet unpublished), indicates that the spleen is concerned with their destruction, and negatives the theory that they are formed by the reticulo-endothelial system.

The increase of platelets in lymphadenoma is of interest in connexion with the proliferation of lymphadenoma giant cells. Two of these cases were examined post mortem, and sections of the bone marrow (femur) showed proliferation of megalocaryocytes. In one case especially, which had a platelet count of over a million, numerous young megalocaryocytes were present. In many cases these were difficult to distinguish from giant lymphadenoma cells, both presenting clear vesicular lobed nuclei with well-marked nucleoli, and irregular, badly defined, pale-staining cytoplasm. The bone marrow from several cases of broncho-pneumonia in young children was also examined and showed numerous megalocaryocytes, some young forms being present, which again presented a striking resemblance to the lymphadenoma cell. As the megalocaryocyte gets older, it grows much larger, the nucleus becomes multi-lobed, stains more darkly, is less vesicular, and does not show nucleoli so distinctly; in the terminal stages pyknotic forms are seen. Such changes have not been met with in the lymphadenoma cell.

Correlation with Coagulation.

In nearly all of the above cases of blood diseases the bleeding time and coagulation time were tested. The bleeding time was estimated by the method described by Duke[1] (loc. cit.). A standard wound was made in the lobe of the ear with puncturing apparatus (B 2216), as supplied by Baird and Tatlock, and each drop of blood, as it exuded, absorbed with filter-paper at intervals of about 15 seconds, avoiding touching the ear, until the bleeding stopped. Normally the bleeding time varies from 2 to 3½ minutes. Coagulation time was estimated by Rodda's[13] method, which, though a rough bedside test, gives more consistent results than any of the coagulometer methods. A drop of blood is taken direct into a clean watch-glass, a grain of No. 6 shot added, and then covered with another watch-glass to prevent evaporation. The glass is now turned from side to side through an angle of 90°, so that the drop of blood runs out into a streak about three-quarters of an inch long. The glass is gently rocked from side to side at intervals of half a minute, the grain of shot rolling to and fro in the drop of blood until coagulation occurs, when it is held by the clot. Normal coagulation time with this method varies from 5 to 10 minutes. In each case a control should be done.

In all the cases tested no direct correlation could be found between the platelet count, bleeding time, and coagulation time. The bleeding time was, however, usually prolonged when the platelets were markedly diminished. The coagulation time appeared to be quite independent of the number of platelets and would seem a very unreliable guide, with regard to tendency to hæmorrhage, apart from cases of hæmophilia, in which the bleeding time and platelets are stated to be approximately normal while the coagulation time is definitely prolonged.

Conclusions.

(1) A considerable diminution in the platelet count was found in pernicious anæmia, lymphatic leukæmia, and purpura hæmorrhagica, whereas an increase in these elements of the blood was noted in lymphadenoma and myelogenous leukæmia.

(2) In those cases of secondary anæmia examined, normal or slightly increased counts were obtained.

(3) Generally speaking, an increase of platelets would seem to be associated with a hyperactivity of the bone marrow and vice versa, suggesting that the platelet originates in this portion of the hæmopoietic system.

(4) In one case examined, splenectomy resulted in a very considerable increase in the platelet count.

(5) An increased bleeding time is associated with a low platelet count.

(6) No correlation could be made out between bleeding time and coagulation time.

I have to thank Dr. S. P. Bedson for his valuable suggestions and criticisms in connexion with this work, and also the visiting staff of the Royal Victoria Infirmary, Newcastle-on-Tyne, and of the East London Hospital, Shadwell, for free access to the cases under their charge.

(*Continued at foot of next page.*)

HOP DERMATITIS.

BY W. J. O'DONOVAN, M.D., M.R.C.P. LOND.,
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ALTHOUGH the annual migration of large numbers of the poor of the East End has long been an established factor in the social life of these workers, and although hopping annually for a fortnight to a month makes breaches in the attendances of out-patients in every department of the London Hospital, dermatitis due to hops has not hitherto been noted in the skin department. Several reasons may be advanced for this, particularly the fact that hopping is regarded as a holiday and never as a serious occupation, and also because there is reason to believe that the condition itself is rare and that the factors favourable for its development are not always present. The condition itself is so severe that patients of years of discretion who find that they cannot go among the hops are more likely to avoid exposure entirely rather than, by suffering repeated attacks, to bring this condition to the notice of our profession.

FIG. 1 (CASE 1).

FIG. 2 (CASE 2).

Two cases of hop dermatitis, both occurring in the same patient for the second time.

Literature.

Dermatological literature is singularly unhelpful. Macleod[1] states that "about a hundred plants have actually been found capable of setting up dermatitis and their number is gradually increasing, especially from abroad," but in this connexion the English hop is not mentioned. Prosser White,[2] merely includes "Nat. Order Cannabinaceæ, Hops when picked," among causes of plant dermatitis. Dale,[3] in his "Pharmacologia," referring to the external application of hops, says only, De Lupulo Salictario—"Extrinsicus sedebat dolores." This attribute of 1693 is to be found again in 1916 in Squire's[4] "Companion to the Pharmacopœia," which says that hops may be used topically as fomentation or poultice in painful inflammations and swellings. The latest Codex[5] mentions that the hop strobiles contain an essential oil called humulene that is a sesquiterpene. Danlos,[6] whose case (1900) I quote, later makes mention of a barren search of the literature for a similar case. In the 1923 edition of Bernhard Smith's "Poisonous Plants of All Countries," humulus lupulus is not mentioned. Dr. John Badham,[7] writing from Worksop, Notts, in October, 1834, describes fully the case of a girl, Mary Bell, aged 14. He gives a reason for his writing "as I have not been able to find a case of the kind recorded by any authors, English or foreign." His patient attributed her symptoms to immersing her hands, then suffering with chilblains, in a hop-bin to warm them. Shortly after this she began to feel a smarting or tingling in the hands as if she had been stung by nettles. In a few hours a distinct cuticular efflorescence appeared accompanied by a *strong disposition to sleep*; vision was impaired and she fell into profound slumber. The morning after her face was covered with a deep erythema, her eyelids were closed by tumefaction, by the evening the hands and face were covered with vesicles, and in four more days the patient was desquamating and convalescing. "The interest of this case appears to consist, first in its appearing to prove the physiological fact of cutaneous absorption; and second because it discovers a new and hitherto unsuspected acrid principle in the hop."

Danlos's reference[6] to the condition is as follows:—

Eczéma artificiel provoqué par le houblon.—Il s'agit d'une femme de 67 ans, entrée à l'hôpital avec un eczéma typique de la figure (gonflement des paupières et des joues, vésiculation abondante) et de la face dorsale des mains (vésicules groupées, sous-épidermiques, confluentes); la malade nous dit que les accidents se produisent chez elle pour la seconde fois dans les mêmes circonstances. Il y a cinq ans, c'est après avoir été occupée pendant un mois à tirer du houblon qu'elle a vu se développer l'éruption. Cette fois, c'est après deux jours seulement de travail que le mal est apparu. "Cinq autres femmes, employées au même travail, avaient présenté de semblables accidents."

Sabouraud and other distinguished French dermatologists concurred in the writer's diagnosis of his case.

Case Records.

The following two cases were recently admitted as out-patients to the London Hospital.

CASE 1.—E. B., aged 20, a usually healthy blonde, first went hopping when a girl of 12 and was laid up then with erysipelas of the face. For the second time in her life she, this year, again went hopping in Kent, and her face itched as soon as she entered the hop-field. She gave up at the end of the day and appeared at the skin clinic of the London Hospital on Sept. 4th, 1924, with an eruption of four days' standing which had been diagnosed as erythema solare! Her face was red and swollen, the eyelids were markedly distended with œdema, and the affected skin was covered with small, often broken, vesicles. There was no adenitis, no conjunctival congestion, no pityriasis capitis, no focus of purulent inflammation, and no fever. She complained only of the deformity, the itching, and the tightness of the skin of her face. When seen again in five days she was almost well. (Fig. 1.)

CASE 2.—A. B., aged 16, was also a blonde. She remembered no recent illness and appeared at Dr. J. H. Sequeira's clinic on the same morning as the previous case, being sent to us as a case of urticaria. She had travelled to visit

(*Continued from previous page.*)

BLOOD PLATELETS IN ANÆMIAS, ETC.: REFERENCES.

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relations in the hop-fields on Monday; on Tuesday her "forehead broke out in pimples," on Wednesday her whole face was swollen, and on Thursday, Sept. 4th, 1924, she was led to the hospital by her mother, unable to see. The patient's face was red and very swollen, the surface papular and moist, her eyes were occluded by œdema of the lids, on her neck were numerous small and large discrete red papules. On her forearms were several discrete red papules and many red raised linear abrasions up to four inches long, due to scratches by the hop bine. When seen again in five days all swelling was gone and the skin was clear, save for small scabs on the chin. It is noteworthy that this patient, too, when aged 12, as in the case of E. B., was brought to the hospital from the hop-fields on Sept. 28th, 1920, for what was then termed impetigo of the face and arms, and was apparently cured after two visits. (Fig. 2.)

Summary.

In a characteristic case of plant poisoning the hands, face, and genitals are covered with closely placed minute vesicles and bullæ on an erythematous base. There is often considerable tumefaction. The eruption is often mistaken for erysipelas, but its appearance in gardeners (amateurs or professional) should lead to careful inquiry as to the possibility of plant poisoning.[4] It can be seen that the cases I have described follow closely the general type-reaction as described by Sequeira. Females only, so far, have been affected, from the ages of 12 up to 67, always in the month of *September*. The eruption is severe and recurs rapidly on re-exposure. The diagnoses that have been so far suggested, before the occupational ætiology was appreciated, were impetigo, erysipelas, hydroa, and urticaria.

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THE VITAMIN-A CONTENT OF CERTAIN VEGETABLE OILS.

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THE following are notes of some experiments, carried out at the Nutrition Laboratory, Port Sunlight, on the vitamin-A content of certain oils.

I. *Arachis and Linseed Oils.*

Drummond and Coward (1920)[1] have reported that the amount of vitamin A in vegetable oils depends (*a*) upon the source from which the oil is derived, and (*b*) upon the method of preparation and refinement. They also found that linseed oil was not entirely destitute of vitamin A unless it had been reduced, in which case the vitamin was lost. The linseed oil used was cold drawn from whole seeds, and not having been subjected to any drastic methods of refinement, would consequently be expected to retain any vitamin originally present.

The usual method of preparing arachis oil is by cold drawing from dried seeds. This produces the finest quality. A second grade may be obtained by moistening and heating the residue from the former process. It is refined by allowing it to stand for some time and filtering the supernatant liquid. The latter is afterwards treated with fullers' earth and animal charcoal which bleaches it (and possibly removes some of the vitamin which may become absorbed). In the sample I used, the nuts, previous to being cold drawn, had been decorticated, and this might be expected to have a deleterious effect upon the vitamin-B content of the oil, since it is to be supposed that, as in the case of other seeds, this vitamin is localised in the pericarp. The absence of any vitamin B from the oil, however, would have been made up in the food of the animals under experiment by the addition of the marmite extract used, and consequently one would not have expected the growth of the animals to be impaired on this account. Mellanby[2] has found that arachis oil is protective against rickets, but, beyond this, there is little that can be found in the literature as regards its vitamin content.

Technique.

The technique of the experiments was as described previously (Stammers, 1921),[3] eight animals being used for each experiment and eight as controls, fed on basal diet plus butter fat. The experiments were carried out under winter conditions, so that the growth from butter fat was not as good as otherwise might be expected. They were continued for 101 days. At the commencement the average weights were as follows:—

Linseed oil animals	53 g.
Arachis „ „	54 g.
Butter fat (controls)	57 g.

and at the conclusion:

Linseed oil animals	74 g.
Arachis „ „	61 g.
Controls	146 g.

The gain in weight over this experimental period, therefore, was:

Linseed oil animals	21 g.
Arachis „ „	7 g.
Controls	89 g.

Four of the linseed oil and three of the arachis oil animals died before the twenty-eighth day of the experiment, after exhibiting symptoms of some infection of the urogenital tract[4] and considerable distension of the abdomen. The latter, on post-mortem examination, proved to be due to the intestines being inflated with gas. These animals must, therefore, be left out of account, as their deaths were not, in all probability, due to any deficiency of vitamins in the diet. In this connexion, it is noteworthy that five of the butter fat controls also succumbed before the thirtieth day, apparently from the same cause as the others, as their symptoms were identical. Consequently, after this period, the growth is judged upon four linseed oil animals, five arachis oil, and three butter fat, and the results must therefore be considered in the light of this. Of the remaining animals, two of those fed on linseed oil died on the ninety-fifth day, and there remained two survivors after the termination of the experiment, which, although apparently in very poor condition, had not developed ophthalmia.

Of those fed on arachis oil, three died (on the fifty-seventh, sixty-fourth, and seventy-first days) before the conclusion of the experiment, thus leaving two survivors, both of which exhibited marked signs of ophthalmia. The three controls on butter fat remained in good condition, although their growth was subnormal.

Summary and Conclusions.

The survivors from the linseed oil experiment, although in very poor condition, did not develop ophthalmia, while those from arachis oil did, in a marked degree. This may be due to individual predisposing causes. It is difficult, however, to reconcile this with Mellanby's finding that arachis oil is protective against rickets.

It is concluded that neither of these oils, prepared in the way described, which would probably be the best possible as regards preserving the original vitamin-A content, is of any value as a source of this vitamin.

II. *Maize Oil.*

Two experiments on this product are described. The sample used in the first of these had been in the laboratory for some months and was rancid; it was therefore expected that the vitamin content might have become impaired through oxidation.

The experiment was commenced on Nov. 19th, 1920, and was carried on for 101 days, eight animals (rats) being used with eight controls and the ordinary technique of feeding, weighing, &c., being employed (Stammers, 1921).[3] At the commencement the animals averaged 54 g. in weight, which is about 18 g. above the normal for their ages, and they maintained a superiority to the normal for over three weeks. At the end of the experimental period the average weight was 128·5 g. Three animals died during the course of the experiment, but of these two were due to some unascertained cause and took place before the twenty-fourth day of the experiment. The survivors maintained an excellent state of health up to the end of the experiment, and the growth observed, although showing a considerable falling-off from the normal, yet bears very favourable comparison with that obtained from butter prepared during the winter. As an example of this the following table may be interesting.

The control fat used in this experiment was steam-distilled palm kernel oil (Stammers, 1921)[6] and the animals used as controls averaged 56 g. in weight at the beginning and 53 g. at the end, the maximum average attained being 76 g.

Experimental fat.	Date begins.	Date ends.	No. of days.	Total gain in weight.
Butter fat	12/10/20	21/1/21	101	88 g.
,, ,,	19/10/20	28/1/21	101	75 g.
,, ,,	2/11/20	11/2/21	101	85 g.
Maize oil.	19/11/20	28/2/21	101	75 g.

The second experiment was commenced on April 19th, 1921, and was terminated after 59 days. A sample of fresh maize oil was used which had been refined so that it was tasteless and almost odourless. The oil was pale amber in colour as compared with that used in the first experiment, which was very dark.

The same number of animals both for control and experiment was used as before, and the average weight of both experimental and control animals was 48 g. Steam-distilled palm kernel oil was again used as the control fat. At the conclusion of the experiment the average weight of the experimental animals was 148 g., and of the controls 88 g. The rats were slightly heavier than the normal at the commencement, and they maintained a superiority throughout, although it was somewhat diminished towards the end. During the experiment the animals appeared to be in excellent health and there was no mortality, except among the controls, three of which died after exhibiting symptoms of ophthalmia and general ill-health.

Summary and Conclusions.

Experiments with two samples of maize oil, one crude and rancid and one refined, indicate that the vitamin-A content is high. It compares very favourably with palm oil and with winter butter fat. During the second experiment a concurrent test upon cod-liver oil was being carried on, and the growth from this sample of maize oil showed some superiority to that obtained from the fish oil (Stammers, 1922).[6]

I am indebted to Messrs. Lever Bros., Ltd., for permission to publish these researches.

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5. Stammers: Ibid., xv., 489.
6. Stammers: Ibid., xvi., 663–5 (Exp. 6).

THE KAHN TEST IN GENERAL PARALYSIS.

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SOME months ago my attention was attracted by the Kahn agglutino-precipitation test for syphilis.[1] This test is of very simple technique and has given reliable results in the hands of American workers, Kolmer,[2] Herrold,[3] Grant,[4] and others. Keim and Wile,[5] after comparing this test with the Wassermann in a series of cases of syphilis, classified according to the stage of the disease, came to the conclusion that the Kahn test showed a greater sensitivity in the earlier stages of syphilis, but in the later stages—i.e., tertiary and parasyphilis—it did not appear so sensitive, though comparing very favourably with the Wassermann test. Anderson and Fischer[6] hold that the test has great possibilities as a direct and simple test for the serological diagnosis of syphilis, but recommend that it be more thoroughly worked out before being used as a substitute for the Wassermann.

As the test is one which might easily be carried out in any mental hospital, where it is by no means always convenient to have a Wassermann performed, it would serve to confirm the diagnosis in many a doubtful case of neurosyphilis. Recent work on the treatment of general paralysis would emphasise the importance of an early diagnosis of this condition and, when physical signs are indefinite or confusing, a simple serological test which could be performed on the spot would be of great value.

It was from this point of view that I set out to apply the test to a series of general paralytic bloods on which Wassermann tests were also done. Up to the present the series has been rather limited, chiefly owing to the fact that one phase of syphilis alone has been dealt with, but as Osmond and McClean[7] in this country have published results of the test on a series of 500 cases of general syphilis, it might be of interest to record what has been already done.

The series consisted of 93 bloods from cases of general paralysis, and the technique used was that described by Keim and Wile.[5] An analysis of the results is given here.

(1) 83 cases of G.P.I. giving a positive Wass.

Kahn	+ + + +	20
	+ + +	26
	+ +	22
	+	9
	±	1
doubtful		1
	−	4

(2) 5 cases of G.P.I. giving a doubtful Wass.

Kahn	−	5

(3) 5 cases of G.P.I. giving a negative Wass.

Kahn	+ + +	2
	+ +	1
	+	1
	±	1

In the non-specific bloods used as controls during these tests one false positive was obtained.

Cerebro-spinal Fluid.—Though this test was intended for blood-serum only, I attempted to apply the technique to spinal fluid. Owing to the weaker precipitating capability of the spinal fluid it was necessary to use 1 c.cm. for each test instead of 0·3 c.cm. as in the serum tests; otherwise no alteration in technique was required. This larger quantity of fluid had, as might be expected, a material effect on the test. A longer incubation period was required before the reading was taken, the precipitates were not so distinct, and did not, even in most strongly positive cases, appear in clumps. Many of the precipitates were of such fine flocculation that they could scarcely be seen without the aid of a hand lens. The heavier precipitates were found to settle at the bottom of the tube, and appeared on gentle shaking as fine white flakes floating about. Twelve hours' incubation before reading was usually found to be sufficient. Up to the present the test has been carried out on 70 spinal fluids, of which 61 were from cases of G.P.I. The following are the results:—

Kahn	+	W.R.	+	48 G.P.I.
,,	−	,,	+	6
,,	+	,,	−	4
,,	doubtful	,,	−	1
,,	−	,,	−	2
,,	−	,,	−	9 non-specific cases.

Summary of Results.

Bloods.—In 93 cases of G.P.I.:

Kahn positive in 83, or 89 per cent.; doubtful in 1.
Wassermann positive in 83, or 89 per cent.; doubtful in 5.

Cerebro-spinal Fluid.—In 61 cases of G.P.I.:

Kahn positive in 52, or 5 per cent.; doubtful in 1.
Wassermann positive in 54, or 88 per cent.; doubtful in none.

A large majority of the above cases had received treatment of various forms, malaria, phlogetan, &c., and in some cases this was combined with specific treatment—i.e., salvarsan or tryparsamide. It is impossible to say at this stage what effect the treatment had on the test. Only one untreated case gave a negative Kahn.

The test is simple and rapid, and though it would not appear to be as sensitive as the Wassermann, it is possible that the comparison will be more favourable when a larger number of tests have been performed. It is a good confirmatory test and an excellent routine test for an institution.

I am indebted to Dr. R. M. Clark, medical superintendent, for permission to publish these results, and to Mr. A. H. Fann, chief laboratory assistant, for his valuable help.

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Reviews and Notices of Books.

PRACTICE OF MEDICINE.

Edited by FREDERICK TICE, M.D., Professor of Medicine and Clinical Medicine, and Head of the Department of Medicine, University of Illinois, College of Medicine. Ten Volumes and Desk Index, each volume about 600 pp. London: Butterworth and Co.; Hagerston, Maryland: W. F. Prior Co. 1924. £21.

POSSESSORS of this new system of medicine may, by subscribing £1 15*s.* per annum, receive sets of new pages every year, and in this manner it is hoped that the system, which is bound in leather on the loose-leaf principle, may be kept perpetually up to date. The work is entirely American, and is issued under the chief editorship of Dr. Frederick Tice, Professor of Medicine to the University of Illinois. Assisting him are Dr. Julius Friedenwald, of the University of Maryland, Dr. Julius Grinker of the Northwestern University Medical School, and Dr. Luther F. Warren, of the Long Island College Hospital, who are concerned with editing the articles dealing with gastro-enterology, neurology, and general medicine. More than 100 contributors are responsible for the text, their names including those of Walter C. Alvarez, F. H. Baetjer, Lewellys Barker, Nathan E. Brill, Thomas Richardson Brown, B. B. Crohn, Charles Lyman Greene, B. B. Vincent Lyon, C. E. de M. Sajous, and many others familiar to British readers. The first volume contains five chapters devoted to the history of medicine, after which come chapters on "hypersensitiveness," infection and immunity, focal infections, oral sepsis, the analysis of urine and cerebro-spinal fluid, and case-history taking. Following this somewhat disorderly beginning the second volume takes us to a section wherein the tests of functional efficiency of stomach, pancreas, liver, circulatory system, endocrine glands, and kidneys are discussed in detail. Thenceforward the work proceeds on more familiar lines, specific and tropical infections being completed by the middle of the fifth volume, after which diseases of the various organs are dealt with systematically. The eighth volume is devoted to diseases due to intoxications and those of the endocrine glands, whilst Vols. IX. and X. are almost wholly confined to the nervous system.

A general survey of this work leads to an impression that the general editing leaves much to be desired. The extraordinary assortment of subjects in the commencing volume is particularly open to criticism. On what grounds was it decided to lay such stress on allergy as a general factor in pathology? Why is focal infection brought into such vivid prominence, with emphasis on the work of several observers whose interesting publications still await any convincing measure of confirmation? And why is the history of medicine included in a work whose voluminous pages still find no place for diseases of the skin? These things seem to us to betray a distorted perspective which robs the work of much of the value it should possess. The inclusion of detailed descriptions of methods of studying the functional efficiency of various organs is certainly defensible, and it may be noted that the various authors have in some cases devoted considerable space to full descriptions of methods which they afterwards condemn; since their condemnation is reasoned, and full references are given with each article, this section should be of considerable value to those physicians who appreciate the value of help from the laboratories. In principle, however, it is not easy to see why chemical laboratory methods should be quoted in full when equally expert matters such as bacteriological methods are treated quite briefly. No serious attempt is made to deal systematically with the general pathogenic effects of various important organisms such as the pneumococcus, the streptococcus, or the *Bacillus coli communis*, save in a chapter on certain septicæmias. As a result the reader who desires to ascertain, for example, an author's views on infections due to Friedländer's bacillus, may find himself in difficulties. The index gives no help in this respect, nor can any reference to the subject be traced throughout the work except in a chapter on broncho-pneumonia, where it is stated that this disease is sometimes caused by Gram-negative cocci! When we say that this chapter is sandwiched between one on tuberculosis of the genito-urinary system and the one on the septicæmias already alluded to, the reader will realise that the general arrangement may waste the would-be reader's time.

The index is unworthy of the labour spent in compiling these volumes. Each of these is brought to a conclusion by a page which urges the reader to consult the special desk index which is bound separately. This index is itself introduced by a somewhat unctuous page of advice to the reader, who on seeking to make use of the vaunted volume may be gravely embarrassed. For example, no reference is given to cœliac disease; under cirrhosis of the liver we find no mention of progressive lenticular degeneration, and as that disease is described and indexed as "Wilson's disease," a reader unfamiliar with that title would have difficulty in tracing it. Another rare but well-recognised nervous disease, amaurotic family idiocy, is completely omitted from the index, though a sufficient description of it may be found on p. 198 of Vol. X. Other omissions could be cited which are inexcusable in an index which gives heavy-type references to chappara amargoso, cholamin, krameria, speidel salts, pomegranate root, papain, kamala, and other somewhat obscure nostra. The fact that under Milroy's disease this index gives no fewer than 26 references, all referring to the three pages in a single volume where that disease is dealt with, conveys a good idea of how stupidly this part of the work has been performed.

We have devoted much space to discussing the arrangement and indexing of this system of medicine because it is upon these factors that its general utility must largely depend; of that part of the text which deals with the major descriptions of the various diseases, their clinical features, diagnosis, and treatment we have far more pleasant things to say. Many of the articles are excellent. Special tribute is due to Dr. Herman O. Mosenthal for his excellent treatise on diabetes mellitus; and the thorough study of hepatic diseases by Drs. John Ferguson and W. E. Ferguson, and the chief editor's article on pericarditis are admirable. Most of the articles are followed by a bibliography, which even when incomplete is a valuable feature. If the scheme of issuing new pages yearly is carried out with thoroughness, and if proper care is given to the revision of the index, the publication of this ambitious work will have been amply justified, for a full index will meet many of the difficulties in locating information.

THE LEUCOCYTE IN HEALTH AND DISEASE.

By C. J. BOND, C.M.G., F.R.C.S., Fellow of University College, London; Hon. Consulting Surgeon to the Leicester Royal Infirmary; Member of the Cancer Committee, Ministry of Health. London: H. K. Lewis and Co., Ltd. 1924. Pp. 83. 12*s.* 6*d.*

THE author records the results of a number of experiments upon the reaction of the leucocytes to artificially induced changes in their environment. Many of these observations are of interest, as, for instance, the author's clear demonstration of the return of exuded leucocytes into the granulation tissue of a wound surface. Dr. Bond apparently believes that some change in the activity of these cells is brought about by their sojourn in the "liquor puris." On the basis of certain other experiments with incubated blood-clot he claims to be able to render the polymorphs actively phagocytic of red cells, both homologous and heterologous, and this leads him to the conclusion that substances toxic to leucocytes, when present in excess, may in higher dilutions act as opsonins. In the absence of evidence in the

shape of protocols, either of experiments or controls, it is impossible to judge of the validity of these conclusions. Of many of the other observations it is difficult to understand the purpose, a difficulty which is enhanced by the author's somewhat inconsecutive and disjointed manner of presenting his facts. It is an index to the highly specialised nature of his researches that of the 33 references given 14 are to Dr. Bond's own works. The book concludes with 48 half-page microphotographs showing leucocytes, mostly in obviously indifferent health as the result of the author's attentions.

COLLECTED PAPERS.

Collected Papers, Physiological Laboratory, King's College, London. No. XVII. Edited by W. D. HALLIBURTON, M.D., LL.D., F.R.C.P., F.R.S. 1923–1924.

THE present collection of papers will be the last to appear from the Physiological Laboratories of King's College Hospital under the editorship of Prof. Halliburton. That it need represent the editor's actual farewell to physiology there is fortunately no reason to anticipate. Of the 24 papers dealing with original research comprised in the collection, only two—one on the Appendages of the Brain, and a second short note on the Formation of a Reversible Clot by the Action of Pancreatic Juice on Milk—are from his own pen, but all bear the marks of his inspiration. The papers fall into several groups, of which the largest are those constituted by the publications of C. A. da Fano, on histological subjects, and by Dr. J. W. Pickering in collaboration with other members of the laboratory staff, on various points in connexion with the coagulation of the blood. Of Dr. da Fano's papers some deal with the Golgi apparatus of the cell, some with the histology of epidemic encephalitis with particular reference to the "minute" bodies first described by this observer, and some with the histological changes to be observed in the central and sympathetic nervous systems in the "deficiency" diseases. Dr. Pickering has brought to light many points of interest in connexion with the coagulation of the blood. Among other things he has been able to demonstrate that the anti-coagulant action of peptone on intravenous injection cannot be due, as in the view of Howell, to the production of antithrombin by the liver, for it occurs even when that organ is shut out of the circulation. He believes that neither "thrombin" nor "antithrombin" has any existence as an entity, and that coagulation of the blood depends upon the disturbance of a system formed by a protective colloid united to a fibrinogen-prothrombin complex. Dr. J. A. Hewitt, who also writes as one of Dr. Pickering's collaborators, contributes two papers dealing with the metabolism of the carbohydrates—one a destructive criticism of recent work on the relationship of the production of γ from α and β glucose to diabetes, and one on the absorption of various sugars from the gut. Dr. J. A. Shaw-Mackenzie has papers upon his serum reaction for the diagnosis of carcinoma and upon the treatment of inoperable carcinoma by the intravenous injection of sodium oleate.

BIOCHEMISTRY.

Monographs of Biochemistry. Edited by Prof. R. H. A. PLIMMER and Prof. F. G. HOPKINS. *The Simple Carbohydrates and the Glucosides.* Fourth edition. By E. FRANKLAND ARMSTRONG, D.Sc., Ph.D., F.R.S., F.I.C., Fellow of the City and Guilds of London Institute. London: Longmans, Green and Co. 1924. Pp. 293. 16*s*.

IN the past Germany has been regarded as the home of specialised scientific publications. Thus the *Biochemisches Handlexikon* and the *Physiologische Arbeitsmethoden*, edited by Prof. Abderhalden, have become world-famous as collections of articles by specialists. We should not be going too far, perhaps, to state that these German publications have only two serious rivals—namely, the *American Journal of Physiological Reviews* and the "Monographs of Biochemistry." The latter, under the general editorship of Prof. Plimmer and Prof. Hopkins, have earned a well-deserved popularity in this country, and many of the monographs have run to several editions. The volume under consideration has reached the fourth edition and has been greatly enlarged. It contains a masterly summary of the present state of knowledge on the simple carbohydrates. An account of the recent work of Irvine and his co-workers on the constitution of the polysaccharides has been included; the chapter on the relations between configuration and biological action has been rewritten, and special, but not perhaps sufficiently detailed, reference is made to insulin. A very fine bibliography is added.

We congratulate Prof. Armstrong on the new edition, and strongly recommend it to the study of biochemists.

Practical Biochemistry. Second edition. By W. A. OSBORNE and W. J. YOUNG. Melbourne: W. Ramsay. 1924. Pp. 151. 12*s*. 6*d*.

THE elementary class in practical biochemistry for medical students always presents difficulties to the teacher. In this country the class is composed of two types of men: candidates for university degrees with a certain amount of training in organic chemistry, and students for examination of the Conjoint Board by whom very little knowledge of the subject has been acquired. The former class treat the elementary biochemical tests with contempt, since they have performed the majority of them before, whilst the latter are bewildered by even the most simple organic problems. The existing English books on practical work are of very little assistance in overcoming these difficulties, since they are either too chemical or contain soul-destroying experiments with bread, butter, and milk.

The authors of the present volume are to be congratulated in that they have balanced pure and bio-chemistry very evenly, with the result that the reading and experimental matter are of interest to all types of students. The biochemical significance of all the reactions is emphasised, and futile experiments are not described. The section dealing with carbohydrates is admirable; for example, the explanation of the butylene oxide formula for glucose, as here set out, must lose its terror, even for the most elementary student. It is unfortunate that no clinical blood estimations are included, but we may expect this in the promised companion volume on advanced biochemistry.

HYGIENE AND PUBLIC HEALTH.

Fifth edition. By BIRENDRANATH GHOSH, F.R.F.P.S. London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd.; Calcutta: Hilton and Co. 1924. Pp. 586. 9*s*. 6*d*.

THE fifth edition of this concisely written but comprehensive text-book will be welcomed by students of sanitation in India and the tropics. Every chapter has been carefully revised, and it has been found necessary to increase the size of the book by 79 pages. The experience of the war has altered many of our ideas on the subject of the purification of water, and the chlorination of water is now dealt with in some detail. Many of the lessons learnt during the war as to the disposal of refuse, the incineration of night-soil, and the use of improved types of latrines have also been drawn upon. In the chapter on the disposal of sewage the activated sludge process is dealt with. We note, however, that the blowing-in of air is described as a necessary feature of this new process, whereas experience in Sheffield and other places has shown that the simpler and less expensive plan of aerating the sewage by means of paddle-wheels gives equally good results. In the chapter on food, vitamins are less fully treated than is usual nowadays. Little attention is given to the use of dried milk. The opinion of most public health workers in the tropics is that

dried milk especially prepared and packed for the tropics is almost an ideal way of meeting the many difficulties involved in securing a satisfactory milk-supply in hot countries.

The smoke nuisance receives little or no attention; we believe that some attempt has been made by the responsible authorities to tackle the factory smoke nuisance in Calcutta and other parts of India. The chapters on vital statistics and maternity and child welfare indicate the immensity of the problem. For example, the average infantile mortality-rate for Calcutta during recent years has been well over 300 per 1000, and about 25,000 to 30,000 mothers in Bengal die every year from causes connected with child-bearing. The chapters on the transmission of diseases by insects and on animal parasites are especially good. A useful section on village sanitation and the sanitation of fairs and religious festivals conclude the book. There are many new illustrations in this edition.

HOME SEWAGE DISPOSAL.

By W. A. HARDENBERGH, Sanitary Engineer and Director of Rural Sanitation, Jefferson County Board of Health, Alabama. London: J. B. Lippincott Company. 1924. Pp. 274. 16*s*.

THIS book fulfils its object in supplying reliable data for health officers and sanitary engineers engaged in solving sewage disposal problems for single homes, small communities, and institutions, and at the same time lays down the principles underlying such problems. The early chapters show the extent of the difficulties encountered in the U.S.A. The author estimates that only 40 per cent. of the population, practically all living in cities, are provided with sewers, and that to the remainder, numbering some 65 millions, the lessons of this book apply. He goes on to show that wherever, as the result of a survey, sanitary privies have been installed in place of unsanitary, a great reduction in the prevalence of typhoid fever has followed. The importance of a sanitary disposal of the body wastes in the prevention of diarrhœa, dysentery, and hook-worm disease (from which disease two millions of the U.S.A. population are said to be suffering) is also emphasised. Details are given of various types of closets and types of septic tank treatment which have proved satisfactory in the U.S.A. The essentials laid down for any method are that it must prevent: (1) the access of flies or animals to the excreta; (2) the scattering of excreta so as to cause soil pollution; (3) the pollution of drinking water or ground water. The English reader may be surprised to find no mention of earth closets. There is certainly difficulty in inducing a rural population to take the trouble required for the proper management of earth closets, but, when this inertia can be overcome, the earth closet, in the opinion of most medical officers of health confronted with the problem in this country, is the best solution. It may be that the prevalence of hook-worm disease renders the earth closet unsuitable for use in America.

DR. PORTEOUS.

By ARTHUR BREBNER. London: A. M. Philpot, Ltd. 1924. Pp. 260. 7*s*. 6*d*.

THIS book is a thoroughly well written account of the life of a general practitioner before the passage of the Insurance Act, and, as questions concerning the vast medical side of this legislation are always with us, and just now bid fair to be brought to the political front, it deserves close perusal for other reasons than its merits as a story. Those merits, it may be said, are high, for it is a well-written and well-observed study of the doctor's life at the end of the last and the beginning of this century. The episodes are, no doubt, arranged for purposes of composition and would not necessarily occur in the lives of many practitioners, or in the same circumstances or in the same order, but as episodes they are illustrative and often poignant.

Certain lines of quotation, placed on the title-page, explain why the hero is found at the end of the book to have deserted the calling of medicine: they are, "let every man be artist of his days, and carve into his life his own caprice." This motto dictates a transfer of Dr. Porteous's energies from general medical practice into the pursuit of art, where his career is triumphant but hardly so close to the facts of life as are his experiences as medical student, assistant, and general practitioner. Indeed, his history as an artist cannot often have been paralleled, and medical men who employ their leisure in painting need not think that their talents can usually be put to such fruitful use. Certainly Dr. Porteous conducted his art education in an effective manner, for during his career as a student he found time to sketch, to copy, to study masterpieces in galleries, to secure models among the porters at the hospital, and to cope with the theories of perspective. By chance he made some water-colour drawings to illustrate a text-book of dermatology by one of his chiefs, and as events turned out, this was a critical action in his life, for when, after many bitter experiences, failure as a medical practitioner seemed to stare him in the face a substantial cheque for these drawings arrived, and, further, the eminent dermatologist, who had been his teacher, put him into touch with an amazing art agent who gave large cheques for pictures on their merits without regard to their market value or their signatures. This gentleman saw one of Dr. Porteous's canvasses, immediately gave him £900 for it, and organised an exhibition on the opening of which the critics confirmed the great merit of the work. At which point the book ends in the distinct promise that the hero will carry all before him in the world of art and live happy and prosperous in the companionship of the devoted wife, who had supported him in his troubles.

Dr. Brebner, who died some ten years ago, had already two successful novels to his name when he wrote this posthumous work.

PICKETT-THOMSON RESEARCH LABORATORY.

Annals of the Pickett-Thomson Research Laboratory. Vol. I., No. 1., July, 1924. Issued from St. Paul's Hospital, London, W.C. Pp. 216. 25*s*.

THIS handsome volume is prefaced by photographs of Sir Ronald Ross and Mr. Pickett, and three views of the interior of the laboratory, which appears to be a very pleasant and well-equipped building. The major part of the Annals consists of three papers by Dr. David Thomson, entitled Researches on the Virus of Variola-Vaccinia, Researches on the Etiology of Measles, and Researches on the Etiology of Scarlet Fever, which occupy about nine-tenths of the volume. These articles are not reprints of papers published elsewhere, but are rather specially written essays. It should be mentioned at once that the researches chronicled are mainly those of workers outside these laboratories, which occupy some 123 pages whilst those of the author, excluding illustrations, only occupy 27 pages, a certain proportion of which is given up to discussions and conclusions. A good deal of Dr. Thomson's personal investigations are concerned with attempts to grow the viruses of the exanthemata in a large variety of media and in tissue cultures. The results in the first case are mainly negative, and in the second are uncertain and inconclusive. Thus, whilst the review of literature is sound and full, and whilst this portion of the volume may be of assistance to those anxious to obtain a résumé of current and past ideas on the subject covered, the amount of original work is relatively insignificant. The conclusions arrived at, briefly summarised, are that the Guarnieri bodies of variola are true parasites, and that as regards measles "the suspicious organisms so far which deserve further investigation are the diplococcus of Tunnicliffe, the streptococci, influenzoid bacilli, and the spirochæte of Salimbeni." The streptococcus is favourably regarded as the causal agent in scarlet fever. The

papers are abundantly illustrated by some excellent photographs and coloured plates. Other minor papers bear upon the value of "detoxicated" vaccines in the complications of scarlet fever and in the tuberculin test in cattle, as well as upon experiments on the various methods of detoxication; there is also a description of certain cultural characters of organisms of the meningococcus, gonococcus, and catarrhalis groups, and the distinctive appearances of types and strains which, following Atkin, are utilised for their identification and grouping. The last paper, a clinical one in the main, contains an interesting description of cases of gas poisoning resulting from the breaking down of ammunition in the factory of F. N. Pickett et fils. This comes with something of a shock in reviving almost forgotten memories of matters which were so vividly in the forefront of our preoccupations some eight or nine years ago.

It is not easy to understand quite why the present volume has been written. If it is to be taken as a practical attempt to contribute to our knowledge of disease, as the title of the various papers suggests, it must be said that from the point of view of the laboratory worker it does not succeed in this aim.

MEDICAL INSURANCE PRACTICE.

Second edition. By R. W. HARRIS and LEONARD SHOETEN SACK. London: The Scientific Press, Ltd. 1924. Pp. 347. 7*s.* 6*d.*

A SECOND and revised edition of this useful little book has appeared within two years of the first. It is described by the authors, one of whom was formerly assistant secretary in the Ministry of Health, and the other is a barrister-at-law, as a work of reference to the medical benefit provisions of the National Health Insurance Acts. The revised edition incorporates the amendments effected by the Regulations of 1924, an asterisk being placed against new or amended paragraphs in order to call the reader's attention to points on which he should refresh his memory. We have already commended this book as indispensable to the practitioner who wishes to give the best service to his insurance patients with the minimum of risk and inconvenience to himself, and we do so again.

JOURNALS.

BRITISH JOURNAL OF OPHTHALMOLOGY, August, 1924.—F. A. Williamson-Noble describes an apparatus for performing a retinoscopy on a patient with undilated pupil. The apparatus is fixed, and the determination of the shadow movement is effected not by the tilting of the mirror, but by the movement by the observer of his own head.—C. H. Usher contributes a note on the Dog's Tapetum in early life. The tapetum is the structure that causes the green or yellow reflex that is apparent on illuminating the fundus of many animals. Usher by repeated examination has found that it is absent in young puppies up to about the seventh week of life, and that when it is first seen the appearance differs markedly from that seen in the adult animal.—G. F. Rochat and W. Mulder contribute a clinically important paper on Progressive Atrophy of the Iris with Formation of Holes and Glaucoma. It has generally been thought that atrophy of the iris is a condition secondary to disease of the eye, either glaucoma or cyclitis. A few cases, however, have been described in which atrophy and formation of holes in the iris have existed without any apparent cause. The authors describe a case in which the condition was well marked and in which at first the eye was otherwise normal in every respect. Some years later, however, it became blind from glaucoma. In this case, therefore, the atrophy of the iris appears to have been the primary disease.—H. J. Flieringa describes a case of uniocular paralysis of accommodation in a girl of 10 occurring after an affection of the throat which was presumably diphtheritic and clearing up in the ordinary way. A one-sided case of this sort is a rarity.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following table gives some of the principal health statistics of seven boroughs during 1923:—

Name of borough.	Estimated mid-year population.	Birth-rate.	Death-rates per 1000 of the population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Resp. diseases with influenza.	Neonatal mortality.	Infant mortality.	Maternal mort. from childbirth.
Paisley	86,027	23·5	11·5	1·2	1·3	1·3	32	66	6·5
Cambridge ..	59,130	14·8	10·5	0·9	1·6	1·5	25	48	1·1
Nuneaton ..	44 030	22·6	9·4	0·9	0·8	1·9	40	75	3·0
Colchester ..	43,002	18·6	9·7	0·8	1·3	1·4	25	42	3·6
Llanelly.. ..	38,300	23·2	10·7	1·6	0·8	1·4	31	70	1·1
Shrewsbury ..	31,600	19·8	12·7	1·0	1·3	2·9	25	62	3·2
Wrexham ..	19,420	18·8	12·9	1·4	1·4	2·2	27	79	2·7

Paisley.

Dr. G. V. T. McMichael includes in his report a drawing of the elevation, and also the plans, of the Central Medical Institute for the mothers and children of Paisley, presented to the town by Miss Russell, of Muirfield. The elevation shows a handsome building occupying a corner site. On the ground floor are the tuberculosis department and the maternity and child welfare department. On the first floor are the minor ailment clinic and the special treatment clinic for diseases of the eye, ear, nose, throat, &c., also the main office of the school medical department. On the second floor are the dental clinic, the orthopædic department, and an X ray department. The plans indicate a building excellently equipped for its purpose. Dr. McMichael, in discussing the housing problem, suggests that it will never be solved until it is lifted right out of the domain of party politics, and a national policy formulated by experts agreed on by all parties. No one, he says, can honestly be satisfied with the present environment of the working classes, especially in our large industrial towns.

Paisley has its special difficulties, as we are told in another part of the report that 69 per cent. of the houses are of one or two apartments. A very satisfactory arrangement has now been made by which all cases of small-pox in Renfrewshire are to be accommodated in the West Renfrewshire small-pox hospital. This arrangement makes the Paisley small-pox hospital permanently available as a clearing house for all cases of tuberculosis requiring institutional treatment. Dr. McMichael is well satisfied with the action of the local authority in 1922 in making all forms of pneumonia notifiable. This has enabled the department to offer hospital treatment to all the severe cases of measles and whooping-cough. A further need is convalescent home treatment for these two diseases. An unusual occurrence mentioned in the report is an outbreak of dysentery. Six members of one household were attacked, the infective organism being the Flexner (Z) bacillus. The first case, a boy of 7, died within 24 hours. At first food poisoning was suspected. The other five cases recovered. Inquiry showed that the father, an ex-Service man, had suffered from dysentery while in the army and had had recurrent attacks of diarrhœa ever since his discharge.

Antenatal work makes progress. During 1923, 404 expectant mothers attended the antenatal clinic, whilst the total births in the year numbered 2020. Dr. McMichael would like to see the Barshaw Maternity

Hospital more fully used, and states that the accommodation there is ample for all serious complications of pregnancy, for abnormal cases of labour, and for necessitous cases. The work of the dental clinic grows. All cases of ophthalmia neonatorum are referred to the Eye Infirmary, and no impairment of sight has resulted from this disease during the past five years. The V.D. clinic opened in October, 1922, is working successfully, and patients are ready and anxious to take advantage of the local facilities for treatment.

Cambridge.

Dr. Andrew J. Laird gives details of the working of the dental clinic for expectant and nursing mothers, and children under 5. Sixty-two mothers took advantage of the treatment offered. The number of extractions was 435, the number of fillings 26, and the number of dentures supplied 28. 117 children under school age were inspected and enrolled in the dental scheme—that is to say, these children will be examined quarterly, and, if necessary, treated, to prevent the incidence of dental disease. Fourteen of these children between the ages of 4 and 5 had 223 sound teeth, 48 decayed saveable teeth, and 8 decayed unsaveable teeth. Dr. Laird reports at length on the housing question. A memorandum of January, 1923, deals with 263 houses, the rents of which vary from 2*s.* to 6*s.* per week. Fully 150 of these would in normal times be dealt with by closing orders. Dr. Laird goes on to say that the urgent requirement of the moment is a smaller and cheaper class of house. He suggests that houses containing two bedrooms with living room and scullery built in terrace form without bathrooms would be desirable. In a memorandum dated November, 1923, he gives information with regard to pre-war modern cottages. These cottages are more than 12 to the acre, the front door opens direct into the front room and there is no bathroom or bath. The area of these houses comes within the standard which entitles them to a subsidy under the Housing Act, 1923. Dr. Laird suggests that these designs, modified to include a food larder and bathroom, might meet the case. A third memorandum dated Nov. 30th, 1923, gives a list of the worst cases of overcrowding in Cambridge, some of them being extremely bad. Proceedings were taken in respect of a milk sample 13 per cent. deficient in fat. The case was dismissed following the judgment given in Hunt *v.* Richardson. In consequence the Cambridge borough council passed a resolution urging the Government to introduce legislation to prevent the sale of milk containing less than 3 per cent. of fat.

Nuneaton.

Dr. K. E. Tapper reports that the percentage of unemployed in Nuneaton has been a low one, and that additional employment has been provided by extension of various factories. The Census figures show that 5756 males are employed in mining and quarrying. The housing shortage still remains acute, though the past year has seen an increase in private enterprise. A hundred dwelling houses a year are needed to meet the growth of the population. During 1923, 89 houses were erected. Dr. Tapper states that the method of the collection of refuse needs improvement. Dust-bins are being substituted for ashpits, and the privies in the sewered areas are being gradually abolished. An extension of the sewers is also needed.

Colchester.

Dr. W. F. Corfield says that the proper housing of the people still causes a good deal of anxiety. A larger number of repairs have been insisted upon than in recent years, but the schedule shows that there are 21 houses quite irreparable, the demolition of which will be recommended as soon as it is possible. Dr. Corfield refers to 1923 as "the amazing year" from a health point of view, and mentions that the mortality of illegitimate infants was only 27·7, there being 36 illegitimate births and only one death of an illegitimate infant. Dr. Corfield regrets that the infant clinic does not seem to appeal to the poorest and most necessitous mothers who need its assistance most. He thinks such mothers do not like meeting mothers better off than themselves who will criticise the poor clothing of their babies. The amount of dried milk sold has increased and the amount given away has decreased. Dr. Corfield thinks the free milk has been of immense benefit. One case of concealment of income in order to obtain free milk occurred during the year. A return recently obtained for another purpose has made it possible to check the statements as to income made by applicants, and it was found that all statements of income given in, excepting the one referred to above, were correct.

Llanelly.

Dr. Laurence W. Pole states that special attention during 1923 has been given to the milk-supply of the town. The borough council decided to refuse registration of premises which retailed goods of a general nature. The Milk and Dairies Act of 1922 has also been used for the improvement of dairy-farms and cowsheds. Dr. Pole would like to have a more exact definition of what is meant by the distribution of milk "likely to endanger the public health." Antenatal work is making but slow progress, but Dr. Pole thinks real progress would result through the coöperation of the midwives if the town council were made the supervising authority under the Act.

In the school report it is mentioned that four classes for dull and backward children were formed during the year and have worked with very satisfactory results. Dental treatment is to be begun, as the education committee have approved the appointment of a whole-time dental surgeon. A very satisfactory report is submitted by the instructor in physical training. A class for teachers aroused much interest and only a third of the applicants could be accommodated. A physical training display was organised in June, in which 3000 children took part. About £200 were raised and this sum was utilised to send 100 boys to a holiday camp during August. For the purpose of the camp about 10 acres of land close to a good beach were obtained on the Gower coast some 20 miles from Llanelly. The description given of the camp indicates that the experiment was a great success.

Shrewsbury.

Dr. H. Gordon Smith mentions among noteworthy improvements during the year the provision of a plant for filtering, aerating, re-heating, and circulating the water in the swimming baths. Since the installation of Bell's pressure filters for the Severn water in 1909, Dr. Smith says that enteric fever has been almost unknown. These filters were renovated during 1923. In November the new Shrewsbury and Atcham joint isolation hospital was opened with accommodation for 26 patients. Dr. Smith refers to the prevalence of goitre in Shropshire, but thinks that the estimate that one in five of the female population of Shrewsbury are affected is an exaggeration. He further points out that the disease can readily be prevented by the use of a suitable form of iodine, as has been successfully done in America. An antenatal clinic, conducted by an experienced local practitioner, will be opened during the present year. Severe epidemics of measles and whooping-cough during the year made it necessary to increase the amount of free milk distributed at the centre. Owing to foot-and-mouth disease the number of animals slaughtered at the public abattoir shows a decrease. A vat has been installed for sterilising and rendering down condemned meat, to take the place of the former unsatisfactory procedure of drenching with disinfectant and delivering to a farmer for burial. Municipal housing schemes make slow but steady progress, and an impetus has been given to private enterprise during the last few months. Unfit houses are only patched, but the council intends to close a few of the worst and to offer the tenants accommodation in the municipal houses. As many of

these tenants are paying very low rents they will require financial assistance to enable them to occupy the municipal houses. The housing committee also give sympathetic consideration in the allocation of houses to families affected by tuberculosis.

Wrexham.

Dr. T. P. Edwards took up his appointment as medical officer of health on Oct. 1st, 1923. One of the chief events of the year was the removal of the maternity and child welfare centre to new and commodious premises in Grosvenor-road. As a result of the move there has been a considerable increase in the attendances. A maternity hospital is needed, and it is hoped to obtain such by coöperation with the county. The only lying-in accommodation at present available is at the hospital of the Wrexham Board of Guardians. The health visitors' reports emphasise the urgent need for working-class houses and give numerous examples of mothers being confined in overcrowded houses. Out of 375 confinements 114 occurred in apartments. These circumstances make the need for a maternity hospital more urgent. Dr. Edwards says that the houses built at present, whether by private enterprise or under the municipal scheme, are not available for the working classes, and that what is needed is the erection of a large number of houses at a low economic rent. It was feared at one period during the year that the severe epidemic of foot-and-mouth disease would undermine the economic as well as the hygienic standards of the borough. Work at the public abattoir was interfered with and the borough was threatened with a scarcity of milk. A new public abattoir is needed. There is one private slaughter-house in the borough and only 12 of the 50 Wrexham butchers use the present public one, the remainder using slaughter-houses outside the borough. There are six common lodging-houses in Wrexham, and the question of providing a municipal model common lodging-house was considered during the year.

MENTAL HOSPITALS SERVICE.

Staffordshire.

THE annual report of the Staffordshire Mental Hospitals Board for 1923 is the first issued by that recently constituted body. Under an Act passed in 1922, it controls the three mental hospitals of the county, each of which has a newly appointed visiting committee. In spite of this system of central control, the separate reports of the three hospitals here published reveal certain differences in administration. For example, the diet at Burntwood is commended by the Visiting Commissioners as being particularly good, whereas that at Stafford is criticised on the usual ground of monotony. The absence of women members on two of the visiting committees is also the subject of comment. It is evident that certain already long delayed repair and rebuilding schemes are being deferred on grounds of economy. The population of Cheddleton is increasing and has almost reached the capacity limit. Burntwood has actually eight males in excess. At Stafford plans had actually been prepared and an estimate obtained for building separate accommodation for tuberculous cases, but this work is not to be carried out. At Cheddleton the farm buildings were stated in last year's report to be in a thoroughly insanitary condition, but they have not been renovated; the hospital badly needs verandahs for the open-air treatment of tuberculosis and acute confusional cases. It may reasonably be concluded from these facts that a central board not directly and closely acquainted with the needs of any single hospital, but responsible for several, is less likely to be sympathetic to the needs of any one of them than the average committee of management. No better illustration of the fact that "Asylum Reform" is solely a question of municipal finance could possibly be found. Many points of varied interest arise from this report. At Stafford Mental Hospital, of which Dr. B. H. Shaw is medical superintendent, a considerable amount of research is being done, the subjects of the work being sugar tolerance and intestinal bacteriology, with special reference to "a more exact method of identification and classification of the various bacteria present." Particular attention is being paid to organisms capable of producing formaldehyde, the absorption of which is regarded as a possible factor in mental disease. Several cases of dysentery occurred which were traced to a carrier of long standing, who "suddenly became excitable and faulty in her habits, thereby spreading the infection." It is complained that 80 per cent. of patients from a certain union area had been detained first for varying periods in the local Poor-law institution, thereby delaying effective treatment, whereas the total of such cases for other districts was only 17 per cent. A vacuum cleaning plant is being installed, no doubt as a sequel to the work done in this hospital in the past in investigating dust infection. The death-rate is the lowest ever recorded here (6·23 per cent.). Burntwood, which is under the medical direction of Dr. J. B. Spence, is building a cinema and a clinical laboratory. A women's "club ward," providing various amenities for well-behaved patients, such as already exists on the male side, is under consideration. Cheddleton is in danger of overcrowding. It is pointed out that a whole block is occupied by idiots and low-grade imbeciles (40 girls and 41 boys), whose removal to a more suitable institution would provide the necessary space. Great progress has, however, been made in training these cases, thanks to the enthusiasm of two sisters who were first sent to a colony for mental defectives to learn their methods. Dr. W. F. Menzies, the medical superintendent, has further hopes in relation to these cases; if arrangements can be made between his department and a newly established orthopædic centre at Leek, he hopes that some of these children with congenital deformities may be trained to walk, and it is believed that "the nerve energy required for walking actually develops some of the latent areas in the brain, thus enlarging their experience of things outside themselves and leading to further intellectual progress." There are four cases in the hospital whose mental disorder is the sequela of lethargic encephalitis: Dr. Menzies's description of this group is probably the first of its kind to appear in a mental hospital report. Trouble with nurses continues, members of the female staff frequently breaking their contracts. The situation continues to be relieved somewhat by the presence of "Danish fully trained nurses for whom the Danish National Council secures one year's study leave for training here"; it has, therefore, been possible from time to time to enforce the rule of calling for the resignation of those who make no attempt to qualify for the technical examinations, or who fail twice in either the preliminary or final." This hospital has no dispenser, and the nearest X ray plant is at Stoke-on-Trent. Dr. Menzies points out that, apart from the value of radiology in studying gastro-intestinal function, "one hardly likes to be without such facilities even as a precaution, for the courts now generally hold that a medical man who omits to have an injury in a patient X rayed is guilty of malpraxis."

West Sussex.

The report of the West Sussex County Mental Hospital, Chichester, for 1923 records an increase in the number of patients, particularly on the female side, where further accommodation is an almost immediate necessity. This could be obtained by evacuating a ward used at present as sleeping quarters for nurses, which would necessitate building a separate nurses' home. It is pointed out that such homes are coming to be regarded as "absolute necessities" in large mental hospitals, and the amenities afforded by them are calculated to attract and retain in the service a better class of nurse. The Visiting Commissioner, while commenting favourably on the patients'

classification, also suggests the provision of an admission hospital, where newly admitted patients could be kept apart from all others. This hospital has a consulting staff of five members for dental, surgical, and other specialised work, and it is implied that an additional resident medical officer will shortly be appointed, part of whose duties will consist of pathological work. There is a well-equipped laboratory which for some years has remained unused. The death-rate during the year reached the remarkably low figure of 4 per cent. An outbreak of influenza affecting 230 patients and members of the staff threw a great strain on the resources of the hospital, but no case ended fatally, and other infectious disease has been rare. Dr. H. A. Kidd, the medical superintendent, discussing the results of treatment, points out that a recovery-rate, based on all the patients admitted—including congenital cases, senile and organic dementias—does not fairly represent these results, which are shown not only in complete recovery but in relief from active symptoms, in return to orderly conduct, and in improved general health. Separate statements are made by the engineer, steward, and farm bailiff on the work of their departments.

Cardiff.

No remarkable developments are recorded by Dr. E. Goodall in the annual report of the City of Cardiff Mental Hospital for 1923. There has been little change in the number of patients under treatment. The policy of staffing male wards with female nurses is being continued, and it is interesting to note that a number of nurses are being instructed in massage. Research by the pathological staff of three members, who receive grants from the Medical Research Council, has been devoted to the same ends as those referred to in last year's report. They include the estimation of total nitrogen, sugar, and chlorides in the blood and cerebro-spinal fluid of cases of epilepsy, sugar-tolerance tests in epilepsy and general paralysis, an investigation of the toxicity of the blood-serum and corpuscles in acute insanity of various kinds, which has included attempts to produce antibodies by animal inoculations, certain radiographic work on the digestive functions (which has been published and reviewed in our columns[1]), and an "investigation of the bacterial content of the alimentary and urinary tracts," of which insufficient particulars are given to judge of its exact nature. The very large amount of biochemical work carried out during the last few years has been devoted to somewhat unpromising ends, and it is to be hoped that the staff of the best equipped research laboratory in any mental hospital in this country will not be discouraged from breaking some entirely fresh ground by the failure of their work hitherto to produce any definite or illuminating conclusions. It is with some surprise that one reads of a sporadic case of dysentery, from which the stools were sent to the County Public Health Laboratory in Cardiff for bacteriological examination, and the blood for agglutination tests to Oxford. Dysentery is not an uncommon disease in mental hospitals, and it might have been supposed that in an institution so well equipped from the laboratory standpoint as this such work could have been done on the premises.

Birmingham.

The annual report of the asylums committee of the city of Birmingham, as in former years, is a singularly complete and illuminating record of the work at Winson Green, under Dr. C. B. Roscrow, and Rubery Hill, under Dr. T. C. Graves. As an example of its thoroughness may be cited the detailed and enlightened analysis of ætiology in regard not only to the new cases admitted, but to those which recovered during the year. A comparison of these two tables yields no very striking contrasts, but it is interesting to observe that "sepsis" was regarded as a contributory cause in no less than 241 admissions, and had been present in 60 cases which recovered. In order more effectively to cope with bodily conditions whose existence may be supposed to retard recovery, there is now a visiting staff including two throat and aural surgeons, and a gynæcologist, in addition to the dental surgeon. Pathological investigations are, of course, carried out at the Hollymoor Research Laboratory, Hollymoor being an annexe of Rubery Hill. The latter is an old building, and at the present rate of admissions will soon require extension; the Visiting Commissioner expresses the hope that when this is undertaken verandahs, clinical rooms, and other amenities may be included in the plans. His only adverse comment of the administration regards the extensive use of condensed milk in the dietary. Not everyone will agree with Dr. Graves, the medical superintendent of Rubery Hill, in the following observations on occupational treatment: "The subject of employment of mentally afflicted patients has been much under discussion of late, and the term occupational therapy has been devised. I would only remark that prior to the onset of their mental breakdown patients have generally been at work. The proper way to regard employment is as a test of physical and mental capacity during convalescence, in a similar way to that adopted in sanatoria for tuberculosis by graduated exercise and work." The absence of a list of the medical staff is unusual and confusing. In the interest of veracity it should be observed that the possession by all the (assistant) medical officers at Rubery Hill of the Diploma in Psychological Medicine is not a "unique circumstance." At least one other English mental hospital, with a staff of four or five members, possesses this distinction.

Monmouthshire.

In the annual report of the Monmouthshire Asylum, Abergavenny, Dr. N. R. Phillips records a considerable increase in the population of this hospital, which, if continued, will necessitate internal re-arrangement. There is a building, Maindiff Court, which at present remains unused, and several purposes have a claim on it; separate accommodation for recent admissions, and the isolation of the tuberculous, of whom there are 31 known cases in the hospital at the present time, are perhaps the most important. Suggestions from this point of view are made in the report of the Visiting Commissioner, who also criticises the diet, certain mortuary and bathroom arrangements, the system of record-keeping, and the facilities for sterilising foul washing. It is therefore somewhat irritating to read in the remarks of the chairman of the committee that the report of His Majesty's Commissioner "was again quite satisfactory." This report also states that 31 cases of dysentery, with three deaths, occurred between August, 1922, and October, 1923, whereas the report of the medical superintendent observes: "The health of the patients generally was good, and, except for a fatal case of enteric fever and a small amount of colitis, there was no epidemic disease." The death-rate was the lowest on record for the hospital, 5·7 per cent., and the recovery-rate is rising; many patients appear to receive parole and leave on trial, but of the latter very few receive money allowances.

[1] THE LANCET, 1924, i., 859.

SCHOOL MEDICAL SERVICE.

Leeds.

THE Leeds children of subnormal nutrition are kept under strict observation. They are regularly weighed by the school nurse and the results recorded by graphs. Parents are advised as to diet and treatment where necessary, and if a child does not appear to be making sufficiently rapid progress he is presented for examination by the school doctor. Children having free meals are regularly weighed. The parent of every school child in Leeds has been given a leaflet with sensible advice on broad lines as to food and its value. This is evidently necessary. Of the

39 children examined in the nursery school only one was found to have no defects, the other 38 giving a total of 152 various defects. The necessity for nursery schools in industrial areas is obvious, but this figure is alarming. During the autumn an epidemic of conjunctivitis due to the Koch-Weeks bacillus occurred throughout the schools in the city. Prompt measures were taken, and by the end of the year the number of cases had declined considerably, but the number of attendances for this trouble at the clinic had advanced from 4615 during 1922 to 8707 this year. The Central clinic is now completely housed in one building, with good waiting-room accommodation. The consulting rooms are bright and airy, and the new arrangement will add to the comfort of parents and children as well as to that of the staff. Overcrowding of clinics leads to hasty work, which is bound to depreciate in quality.

An interesting investigation into the incidence of defective vision in the various types of schools is given.

	Per cent.		Per cent.
Elementary schools ..	31·1	Special schools ..	38·2
Secondary schools ..	53·0	Industrial schools	55·1
Day trade schools ..	40·0		

The actual numbers of which the percentage is taken is not given, and therefore no positive deductions can be drawn, but it would be an interesting piece of research to work out the actual incidence of defective vision in these schools and to elucidate the amount of myopia in each. A percentage of 29·9 children was found at routine inspection to require treatment. Dr. Algernon Wear laments the apathy of parents with regard to dental defects. Only 39·1 per cent. of the children with dental disease were dealt with during the year. The report on physical training in Leeds is instructive, and an analysis on broad lines of the graph of school absences given at the end would be most useful.

Dewsbury.

The school medical service in Dewsbury has cost the ratepayers 0·73*d.* in the pound, or 2*s.* 1*d.* per school child. A total of 3929 children were inspected in the schools, while medical and dental consultations altogether amounted to 41,747, not including 4018 visits by nurses to the homes of the children. The average cost of each consultation and inspection, including all necessary treatment, worked out at 5*d.* a head. A special investigation into the question of stammering is being conducted, although so far there does not appear to be any class for treatment of these cases, of whom 24 boys and 13 girls have been examined. Of 1151 children inspected by the school dentist 1002 were referred for treatment, and just over two-thirds of these were actually treated, a considerable increase on last year's figure. Dr. Oscar M. Holden deplores the lack of an open-air school in Dewsbury, which he says is no exception to other industrial towns where the number of undersized men and women at present so obvious would be considerably reduced by facilities for open-air education and healthy living.

Nuneaton.

Dr. K. E. Tapper reports that the five-year-old entrants show a high percentage of defects, and he is endeavouring to bring about a closer coöperation between the school medical service and the maternity and child welfare work in Nuneaton. The school clinic, which is open daily for special inspections, had a total of 5739 attendances made by 1648 children. Chorea, both in the acute and early stages, was prevalent among those attending. There was also a large attendance of dyspeptic cases. At the minor-ailment treatment centre 698 children made altogether 5828 attendances. This clinic is held daily by one of the school nurses, a charge of 6*d.* a week being made. In addition, the school clinic is available for tonsil and adenoid operations, refractions and eye defects, dental and X ray treatment. Chronic ear discharge presents the usual problem, and it is hoped that treatment by ionisation will shortly be available for this condition.

St. Helens.

At the routine medical inspection 28·8 per cent. of children attending elementary schools and 23·8 per cent. attending secondary schools were found suffering from defects requiring treatment. Of elementary school-children 71·5 per cent. and of secondary school-children 59·2 per cent. were treated before the end of the year. Dr. Frank Hauxwell gives an interesting graph showing that a rise or fall in the percentage of the total number of cases treated by the local authority does not always mean an increase or decrease in the total number of cases treated. It is apparent, however, from a close study of the figures given, that the percentage of dental defects treated is falling, and indeed is much smaller than the percentage of medical defects treated. That the annual percentage treated should fall from 60 per cent. in 1920 to 37 per cent. in 1923 is the natural result of the increased number of inspections which have to be carried out. With only one dentist it is impossible to treat more than a certain proportion of the defects found. Dr. Hauxwell attributes the smaller proportion of dental defects treated as compared with medical defects to the apathy of parents and lack of education in this direction, as well as to restricted facilities for treatment. It is obvious that additional dental help is required here.

Lindsey.

Dr. R. Ashleigh Glegg reports that 87 per cent. of the children here require dental treatment, while only 15 per cent. were found to need any other definite treatment. He emphasises the need for further dental help, as at present there is one dentist available for 39,000 children, so that only about 5 per cent. can be treated. Dr. Glegg is anxious to extend the teaching of hygiene in schools and urges that it be given a definite place in the time-table, especially in the upper standards.

Blackburn.

The most important developments during the year have been: (1) The establishment of a residential open-air school for delicate children; (2) the appointment of an orthopædic surgeon, and provision for the after-care of cripples; (3) provision for the retention of enlarged tonsils and adenoids cases in hospital for 48 hours after operation; (4) considerable improvements in the sanitary conditions of many of the schools; (5) extension of health education in schools. Considerable progress has been made in developing a scheme for education in health matters. Topical posters have been exhibited in the schools; a booklet entitled "Health Notes" has been distributed to parents, and 23 health rules have been drawn up and rewards given to children who carry out the greatest number. The treatment for stammering started in August, 1921, was continued. Since the inception of these classes 84 children have been dealt with, and of these 46 had a short revision course. The results are good. Fifty-three speak well and clearly, with no stammer. Fourteen speak with occasional hesitation; nine are improved, and eight made no improvement. In those cases where there was complete failure the result was due, as usual, to indifference on the part of the stammerer and his parents, with a consequent lack of coöperation between the home and the school. Dr. W. Allen Daley reports that over 6000 children were examined during the school year, making, with those who received special inspections and reinspections, a total of 11,544 altogether. Of the codé groups 14·6 per cent. were found to require treatment, while of the total number examined 48 per cent. required either treatment or observation.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 6TH, 1924.

Notifications.—The following cases of infectious disease were notified during the week, namely:—Small-pox, 66; scarlet fever, 1419; diphtheria, 662; enteric fever, 108; pneumonia, 419; puerperal fever, 39; cerebro-spinal fever, 4; acute poliomyelitis, 36; acute polio-encephalitis, 3; encephalitis lethargica, 47; typhus fever, 3; dysentery, 5; ophthalmia neonatorum, 121. There were no cases of cholera or plague notified during the week. The 3 cases of typhus fever were notified from St. Helens; 2 cases were notified from the same county borough in the week ended August 16th.

Deaths.—In the aggregate of great towns, including London, there were 5 deaths from enteric fever, none from small-pox, 5 from scarlet fever, 20 from diphtheria, 13 from measles, 17 from influenza. In London itself the diphtheria deaths numbered 8, and the deaths from infantile diarrhœa, which had been 16, 22, and 25 in the preceding three weeks, further increased to 30. A death from typhus was registered from St. Helens.

Fatal Case of Small-pox.—The death of a small-pox case reported during the week ended August 23rd was that of a female infant, aged 3 weeks, whose mother, aged 27, was also suffering from small-pox. Both were unvaccinated. In the case of the mother the rash commenced on August 2nd, and both patients were removed to hospital on August 7th. It is probable that the mother and child were infected shortly after childbirth had occurred. The child was small and wasted, weighing about 5 lb. One or two pustules appeared on the face and fingers, and attempts to vaccinate mother and child were unsuccessful. The child was fed on the bottle with dried milk. In the opinion of Dr. T. E. Francis, medical officer of health for Barnsley, who sends us these details, the small-pox was only a contributory cause of death in this case, the main cause being congenital debility.

PATHOLOGICAL AND BACTERIOLOGICAL LABORATORY ASSISTANTS' ASSOCIATION.

THE first Conference of the Pathological and Bacteriological Laboratory Assistants' Association was held from Sept. 1st to 5th in the Department of Pathology of the University of Edinburgh (by permission of Prof. J. Lorrain Smith), Mr. J. J. Ritchie (Leith) being in the chair.

This Association was founded some years before the war with the object of laying down an educational programme for laboratory assistants.[1] The attendance at the Conference was representative, there being members present from all parts of the country and also from Africa. The local organisation was in the hands of a committee appointed by the Scottish Division of the Association, and a varied programme was arranged.

The Work of the Conference.

Mr. T. D. Hamilton (Edinburgh), the Vice-President, opened the Conference with an address of welcome and read greetings from several overseas members. He then delivered a scholarly lantern lecture on Edinburgh. During the Conference the lectures and demonstrations included the Rockefeller propaganda cinema films Prevention of Malaria (lent by Dr. Andrew Balfour) and Unhooking the Hookworm (lent by Prof. R. T. Leiper); Technique in the Diagnosis of Rabies (A. Norman, Surrey); Demonstration of "Passe Partout" (Tom Read, Manchester); Demonstration of Discharge of Electricity in Gases (Dr. Carse, Edinburgh University); a Rapid Method of Macerating Bone Specimens (F. A. Izzard, Cambridge); the Method of Diagnosing Diphtheria by Toluidine Blue, as used in the Kent County Laboratory (Ernest Arnold, Maidstone); Chromogenic Organisms and Types of Tubercle Bacilli (C. R. Drury, Cambridge); Some Modifications of Staining Processes employed in Laboratory Work (A. Male, London); the Bacteriophage Phenomena (d'Herrelle) (J. A. Galloway); Demonstration on the Large Cambridge Microtome (Thomas D. Hamilton, Edinburgh); Demonstration of Various Paraffin Embedding Apparatus (W. Mason, Edinburgh). A paper was read by Mr. T. Dalling, F.R.C.V.S., on Some Small Things that Matter, and J. J. Ritchie (Leith) read a paper on the Bacteriology of Pyorrhœa Alveolaris. An item of particular interest to laboratory workers was a discussion on Laboratory Economics opened by W. A. Mitchell (Cambridge).

A comprehensive exhibition of laboratory work and apparatus was on view during the Conference. Among the various exhibits were longitudinal paraffin sections of a whole human kidney; celloidin sections of a half hemisphere of the brain; photographs, photomicrographs, and lantern slides of pathological conditions; stained sections illustrating various histological staining methods; museum specimens, casts in gelatin, &c. These exhibits were the work of members in the Scottish division.

An exhibition of objects of tropical interest set up by A. Male, W. J. Muggleton, and E. Steele (London) contained excellent specimens illustrating the life-history of parasites and their insect hosts.

Festivities.

At the dinner on the evening of Sept. 5th Prof. A. E. Boycott, the President, made the presentation to Albert Norman, the founder of the Association, of the first Woodhead Medal, together with an address signed by past and present members of the Executive Council.

Mr. Norman, in reply, referred to the fact that the list of officers of the Pathological and Bacteriological Laboratory Assistants' Association was now printed in the list of members of the Pathological Society of Great Britain and Ireland, and pointed out that this was a mark of great confidence on the part of the Pathological Society.

In proposing the toast of "Our President," Mr. Mitchell spoke of the remarkable interest Prof. Boycott had created in the examinations for the Association certificates.

The toast of the health of Mr. and Mrs. Richard Muir was received with enthusiasm, and Mr. Muir replied in reminiscent vein.

During the Conference many places of interest in and around Edinburgh were visited.

The Woodhead Memorial.

The following are the regulations governing the Woodhead Memorial of Pathological and Bacteriological Assistants' Association:—

1. That the sum (not yet complete) collected from members of the Pathological and Bacteriological Laboratory Assistants' Association and others, invested in trustee securities and known as the Woodhead Prize Fund, be kept as a separate account in the funds of the Association.

2. The administration of the Fund and the award of the Woodhead Prize and Medal shall be entrusted to a committee composed of the secretary to the Council of the Association, the secretary to the Examining Council, or their nominees (to be approved by the Council of the Association), and two registered members not necessarily officers of the Association, appointed by the Council of the Association. The president for the time being shall be asked to act as chairman.

3. At the discretion of the Woodhead Memorial Committee the prize, which shall include the Woodhead Prize Medal, and such cash value from the accumulated interest as the Committee shall determine, may be awarded annually or at intervals of a period of years.

4. By agreement between the Council of the Association and the Committee, the Medal may be given for conspicuous services to laboratory workers; the recipient need not necessarily be a member of the Pathological and Bacteriological Laboratory Assistants' Association.

5. When the Memorial Committee offers the Prize to competition at least six months' notice of the conditions shall be published in the *Laboratory Journal*. Competitions shall be open only to members of the Association. The Memorial Committee shall not be bound to award the Prize when in their judgment no competitor merits it.

A total of £141 has been received for the Fund, and it has been decided to close the subscription list on Oct. 15th.

[1] See THE LANCET, 1921, ii., 91.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 20, 1924.

SUN AND AIR IN LONDON.

A POWERFUL factor in the health of the metropolis is provided by the parks and open spaces under the control of the London County Council. These number over 100, and cover more than 5000 acres in extent. They vary in size from such places as Hampstead Heath and Blackheath, which thrust their way into the sunny and purer upper atmosphere of London, down to the hardly-won colour and greenery of a disused burial ground in the congested slum areas. An enlightened policy in dealing with this public property means much to the physical and moral well-being of London citizens as a whole. Owing to the unsystematic development of the urban area, parks and open spaces have not been automatically provided in the lay-out, but a broader outlook on the health needs of the community is being followed in the development of new areas, and the painfully slow process of adapting outworn conditions to modern ideas should not press so heavily on the next generation.

The main facts regarding London parks and open spaces are engagingly set out in one [1] of a new series of handbooks issued by the County Council. The parks are so arranged as to cater for the tastes of the public in all possible directions, and the recent debates on the question of allowing Sunday games in them afforded the public an opportunity of realising the enormous value of sunshine and air for the recreation and health of young Londoners. Other bodies control open spaces in the metropolitan area, but on the L.C.C. as paramount public health authority rests the responsibility for the prevention and treatment of disease by healthy environment. The Parks and Open Spaces Committee has long had Dr. ALAN RANDLE among its members, and concerted action is taken between this and other committees of the Council in the use of the parks for health. For example, the Education and Parks Committees together arrange for open-air schools for delicate children, which save the ratepayer the alternative of prolonged treatment in hospital or sanatorium. The healing power of the sun, convincingly shown in the Alps, is now beginning to attract the attention that it so richly deserves, and little by little London is learning to value the sun's rays that it has. Alton and Carshalton are convinced users, and the borough of Bermondsey is now seeking to set up a scheme for treatment of cases approved by the medical officer. Those acquainted with this borough will realise that if heliotherapy is possible in such a district, there is a great future for it in London, for on days when direct sunlight is not available the artificial sun can still be used, combined with open air. All who lived in London during the last big coal strike can recall the clearer air and brighter sky which then prevailed and the public should unite to strengthen the hands of the County Council in getting more adequate powers to combat the smoke nuisance. It is not enough to be able to say that London is the healthiest city ever known; as knowledge extends, that knowledge must be applied for the benefit of all citizens and the sunshine must be brought right into the homes of the people.

[1] London Parks and Open Spaces. With a Foreword by Sir James Bird. University of London Press. 1s.

There is one aspect of the use of the parks which has to be constantly borne in mind by the Parks and Open Spaces Committee, and that is the feeling of the general public, which would resent any use by the authorities of open spaces for cases looked on as infective. The public regards as such any variety of tuberculosis and would require complete reassurance that no case dangerous to the general well-being was being treated in a place set aside for public recreation. The allotment of sufficient space to secure adequate privacy for a solarium would itself require careful consideration. Public interest in this matter requires just such stimulus as may be gained by a study of the L.C.C. handbook. Meanwhile, this year it has been a question of "First catch your sun."

PURE BACTERIOLOGY.

THE institution of a course of instruction leading to an examination for a diploma in bacteriology by the University of Manchester is an event of some importance. The study of the subject began along technological lines and mostly in relation to bacteria as causes of disease, and the field thus defined has been pretty faithfully cultivated. Development has been in natural sequence to the fundamental impression made by PASTEUR. LEEUWENHOEK knew about bacteria, but no one took much interest in them until PASTEUR showed that they really mattered in ordinary human life. Hence in general, and perhaps more so in this country than in some others, "bacteriology" has been practically synonymous with "pathological bacteriology," and attention has been concentrated on the relatively insignificant number of species which live in the altogether specialised habitats necessary to their parasitic and semiparasitic modes of life. Of late considerable progress has been made in technological studies in other fields—agriculture, milk and its products, leather, and so on—and the wider outlook thus attained has proved of great advantage in helping us to understand what bacteria are and how they live. But it is quite clear that progress cannot be made indefinitely in this haphazard way and that the time has come when bacteria must be studied as such. Pathological bacteriology is now hampered everywhere by the absence of knowledge on fundamental biological matters. It is, for example, not known how bacteria multiply and whether there is, sometimes or always, something in their life-history which corresponds to a sexual mode of reproduction. This problem is intimately connected with another series of conundrums for the solution of which the epidemiologist waits—questions of variability, mutation, and transmutation. There is no botanical answer if the hygienist asks, What is a "species" of bacillus? Biologically the advantage of this wider study is equally obvious, for bacteria occupy a unique position among live things in respect of their variety of modes of life and their rapidity of multiplication; hours and days and years to a bacillus and to a man are so different quantitatively that they are almost qualitatively distinct. Bacteriology is, then, full of unsolved problems of a nature which may be called botanical, and its future progress depends largely on their solution.

The way in which practice has outrun knowledge is detrimental too in another way. So practically useful has bacteriology proved that those who engage with it are much too often overwhelmed with diagnostic tests. In many cases universities have been so captivated with this aspect of the subject that they have actually exploited it vigorously for the financial support of the department and even in some instances

the partial maintenance of other activities. Such a practice is obviously far from the university ideal, and to it may be attributed in large part the present stagnation of the science in which no discovery of first-rate importance has been made for many years. The hygienic importance of diagnostic bacteriology is beyond question, and if it was in the proper hands—i.e., those of the medical officers of health—it would achieve even more usefulness than it has done already. But to employ those who should be finding and teaching in bacteriology to earn money is as bizarre a proceeding as it would be to charge the professors of Greek and mathematics with the duties of furnishing inscriptions for tombstones and checking the calculations of insurance companies. What there is most needed at the present time by all those who are engaged on the technological applications of bacteriology is the provision of facilities for teaching and research into how bacteria, irrespective of their human importance, live and move and have their being. How this would best be arranged no doubt varies with local circumstances; it may be in the department of hygiene or better in the department of botany. The course and diploma at Manchester are a small beginning along the right lines; we wish Prof. W. W. C. TOPLEY all success with his enterprise.

MILK PROBLEMS.

THE Director of Water Examination may boast of the apparent ease and regularity with which London's seven million persons are supplied with water fit to drink. There is no director of milk examination for London or elsewhere, and if there were he would hang his head. The annual report of the chief medical officer for the Ministry of Health, whose remarks on the milk problem are summarised on p. 620, states that a beginning has been made in setting up new ideals in the milk trade by means of the "grading" Order. It is only a small beginning. There are now, for instance, only enough cows in the country guaranteed free from tuberculosis by the tuberculin test to supply a population of 50,000 with a pint of milk each per day. The reports of medical officers of health as they come in show that the introduction of the Order has excited little or no interest in most districts. The National Milk Publicity Council has its work before it.

The milk problem as it exists to-day, like the slum problem, is a modern one. Before the days of railways the consumer lived near the producer, the milk was delivered fresh, the dairy farms were small, the farmer's wife superintended the dairy, and his daughter did the milking. The labour was therefore of a superior type. With urbanisation and railways the farms became bigger, larger herds of cows were kept, milk no longer fresh was delivered in bulk, and the conduct of milking operations was handed over to labourers. For a long time the dairy farms remained in the towns, the herds were increased in size and housed in buildings not intended for the purpose, and tended by labour unversed in traditions of dairy cleanliness. The new conditions make necessary an even greater regard for cleanliness than in pre-railway days. The first essential therefore is education of the dairy farmer and his staff by means of agencies such as the Reading Institute—such an institute would be welcome in every dairying district—by clean milk competitions and by the efforts of county agricultural organisers. Sir GEORGE NEWMAN remarks that the consumer can demand clean milk, the trade has shown that it can supply it, and each local authority should see that it does. But what are the facts? Although there may be sporadic signs of interest, the public as a whole is apathetic. Only a small section will agitate; the majority will content themselves with neglecting milk as an article of food unless its quality improves. No doubt if improvement occurred they would welcome it and gradually learn to use more milk. Nor have local authorities taken more interest in the matter. The milk produced in their areas is consumed elsewhere, they have been content to leave it to the farmer to satisfy his customers. Some county councils interest themselves in organising clean milk competitions, and in trying to get the district councils to combine for the appointment of veterinary inspectors. Most rural councils, however, imitate the Ministry of Agriculture in their tender treatment of agricultural interests. There are encouraging signs that the Ministry is beginning to see that the interests of the consumer and producer coincide in this matter and that a larger consumption of milk depends upon the production of a better article. Some stimulus must be provided to induce the authority supervising dairies and cowsheds to do its duty. It is open to discussion whether this object would better be secured by grants-in-aid or by transference of the responsibility from the district to the county councils.

There are statutes and Orders which would improve the condition of the milk-supply if they could be put in force. The Council of the British Medical Association recently, however, decided that the time was inopportune to press upon the Government the operation of the Milk and Dairies Act and the Tuberculosis Order of 1914. We do, however, most cordially agree with Dr. H. G. DAIN, who spoke strongly on the subject at the annual meeting in Bradford, that the question of the sale of milk containing tubercle bacilli must not be shelved any longer. The position taken up by Dr. DAIN is substantially as follows: As a profession we are not primarily concerned with the cost, nor are we tied to a particular method, of stopping the sale of tubercle-infected milk, although it might reasonably be made an offence to sell such milk when the addition of so harmless an impurity as water is punishable and when the vendor whose milk disseminates typhoid soon finds himself in trouble with the sanitary authority. We are told that tuberculosis in cattle is so prevalent that to eliminate all tuberculous animals would practically destroy our herds and do away with our milk-supply. To begin by searching for and destroying tuberculous cattle, compensating their owners for the loss, is not economically sound and is to attack the problem from the wrong end. The cost of tuberculosis to the community may be illustrated by the case of a boy, cured of tuberculous hip disease, whose treatment over a period of five years, including a final osteotomy to correct deformity, had cost £500 apart from any medical or surgical fees. The agriculturist, faced some years ago with a disease in potatoes which threatened the whole industry, soon discovered immune varieties of the tuber. In so serious a matter as the stamping out of tuberculosis every effort should be directed towards breeding cattle less subject to this disease. Dr. DAIN's objection to reliance on the grading of milk for elimination of tubercle is that the bulk of the poorer working-class population would continue to drink the lower grades as being less costly, and the net result of grading would be to provide the well-to-do with the opportunity of escaping calamities which their poorer brethren could not avoid. Why should it not be made a punishable offence to offer for sale milk containing tubercle bacilli? It is to-day, Dr. DAIN has the courage to insist, a perfectly practical thing to do.

A SUCCESSFUL ANTI-GOITRE CAMPAIGN.

IN a little handbook[1] on first principles in business, Mr. A. F. SHEPHERD, whose services to hospital campaigns are well known, states that the only practical method whereby one can arrest attention, create interest, carry conviction, arouse desire, and move a composite public to a desired course of action, is through the process of carefully planned educational publicity suited to the present-day sociological structure. Medicine has had too few successes to record in publishing health, although Sir GEORGE NEWMAN may be right in claiming for educational methods some share in the striking improvement of vital statistics in this country during the last decade.

Two examples reach us from abroad. The little Canton of Appenzell has been the scene during the last two years of a remarkable demonstration in health publicity. Dr. HENRY HUNZIKER, of Adliswil, and Dr. HANS EGGENBERGER, of Herisau, being convinced that the ætiological prophylaxis of goitre has been solved, as they say, with as great a degree of certainty as the question of the roundness of the earth, set about inducing the 30,000 rural folk in the canton to make a habit of taking the additional modicum of iodine necessary to rid them of goitre. The simple method chosen was to add a small proportion of potassium iodide to the salt supplied by the dry-goods man. It was impossible to make this substitution compulsory, inasmuch as medical opinion in the canton was not unanimous; Dr. EGGENBERGER, therefore, toured the canton and gave lantern lectures in almost all the villages. Over 10 per cent. of the population took part in the discussions which followed. Both kinds of salt are on sale in the canton, the iodised salt costing two Rappen—that is to say, about one farthing—more per kilo; but as the accompanying graph clearly shows, his publicity campaign resulted

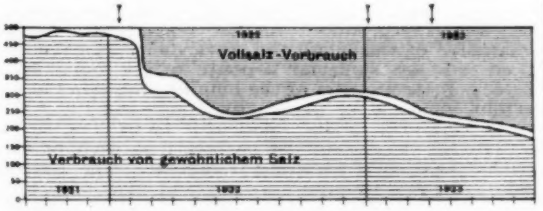

Chart showing the consumption in Appenzell of ordinary salt (below) and iodised salt (above) in sacks of 100 kg. each. At the first arrow the first series of popular lectures began: at the second arrow the second series began; at the third arrow the price of iodised salt was reduced.

within a short time in the substitution of about 243,000 kg. of iodised salt for the ordinary variety, about half the total consumption in fact, allowing for a certain proportion being given to the cattle. This, by the way, is all to the good, for American experience has shown the value of iodised salt for milch cows. Dr. HUNZIKER had to fight against what he described as "iodophobia," for in Switzerland, apparently, every thin person who trembles and palpitates is regarded as suffering from iodism, without any serious endeavour to exclude the equally probable toxic stage of tuberculosis. In his recent book,[2] an instructive example is given of the foolish prejudice against the taking of iodine. In the case of a woman with palpitation, her family doctor blamed the iodised salt, which was thrown away, a child being sent to the dealer to fetch non-iodised salt. After the troublesome symptoms had duly passed away, it came out that the dealer in question had nothing but iodised salt to sell; and, when this was explained to the patient, she was cured not only of her palpitation but also of her prejudice. A year previously this woman had borne in hospital a child with large congenital struma compressing the trachea; a year later, during which she took iodised salt, a lusty infant was born to her without palpable thyroid. Dr. HUNZIKER will only admit to having seen two patients with transient thyroid symptoms from iodism. Both were taking iodised salt, but one had consumed also three bottles of Wildegger iodine water and the other had taken chocolate tablets of iodostarin, both of which increased the iodine ration by one hundred times or more. The result of the campaign, as Dr. HUNZIKER sets out, after two years' experience, is that no goitrous being comes into the world, and no new goitres develop in Appenzell. Measurement of existing goitres shows a diminution in all the young forms and some of the older. Iodised salt, in the author's opinion, is to be regarded not as a medicine but as a food which is able to free Switzerland and other goitrous countries from goitre and cretinism. On a small scale the result certainly seems to be as striking as the claim.

The second example is in progress in New Zealand where the problem of goitre is urgent, and the iodine theory, if not universally accepted, is being tested with provisional conviction. Prof. A. M. DRENNAN, of Dunedin, is working on the relation to goitre of iodine in the soil and in vegetables grown on that soil, but is not prepared yet with a final answer. In a volume of studies[3] from the Otago Medical School, Dr. C. E. HERCUS and Dr. E. S. BAKER analyse the rival theories for the origin of endemic goitre and find in New Zealand the geological aspect of the problem alone worthy of further consideration. It is along river valleys, on plains formed from sedimentary deposits out of which soluble salts have been washed, that endemic goitre occurs. In such areas a census has shown a high percentage of thyroid hypertrophy in the fifth year of life with increased incidence, particularly in girls, at the time of puberty. In this volume Dr. HERCUS and Dr. BAKER describe publicly for the first time a study of prophylactic iodine treatment among the children of two city schools in Canterbury and a third at Timaru, a hundred miles away. The administrative difficulties were considerable, for it was necessary to obtain authority from the Education Board, coöperation of teachers, consent of parents, equipment for dispensing, a general health record of the children, special neck measurements and observations of six-monthly progress. These difficulties were overcome. In 1921 less than half the parents were willing; in 1922 two-thirds of them consented, and children joined the schools for the express purpose of obtaining treatment. The letter addressed to parents ran thus:

"An investigation into the prevention of goitre is being undertaken by the school medical officer. The treatment will follow very closely the lines of a similar experiment in America which has been, apparently, very successful. The treatment consists of minute doses of a salt containing a compound of iodine. It will not upset the digestion because the dose is so small, a mere trace of iodine. During the treatment the children will be carefully watched by the school medical officer, and the treatment stopped if it disagrees in any way. No child will be treated without the consent in writing of the parent or guardian."

The method adopted was to give weekly doses for ten weeks in each term of 4, 2, or 1½ gr. of KI respectively, according to the size of the child, dissolved in half an ounce of water. In the Timaru school it was found more convenient to give the iodine in pill form. Children of parents who refused supplied the controls. The total records analysed were 1514, and among 35 per cent. of treated children the goitre diminished as against 15 per cent. among the untreated. The iodine was found to work rapidly.

[1] Business First Principles. London: Business Builders, Ltd., 26, Great Ormond-street, W.C. 1s.

[2] Die Prophylaxe der grossen Schilddrüse. Berne and Leipzig: Ernst Bircher. 1924. Pp. 360. Fr.12.

[3] Proceedings of the University of Otago Medical School. No. 2. 1924. Edited by D. W. Carmalt-Jones, M.D., F.R.C.P. Dunedin, N.Z.

Annotations.

"Ne quid nimis."

THE VITAL STATISTICS OF 1923.[1]

WHATEVER advantages the present system of issuing the matter once contained in a single volume in three may possess, to the journalist it is an unmixed evil. He must either abstain from comment or run the risk of doing ill what Dr. T. H. D. Stevenson will do well in another instalment of the official records. Yet we cannot pass this great, this impressive record without a word. In 1923, 444,785 persons died, the smallest total of deaths since 1862, when the population was little more than twenty millions—now it is more than thirty-eight millions. The standardised death-rate was 10·3 per 1000, less than half what it was in 1841–50, 40 per cent. short of the death-rate Farr proposed as an attainable but unattained ideal 50 years ago. The rate of mortality in childhood, ages 0–5, is one-third of what it was in 1841–50, the rate of infant mortality has declined from 153 to 69 per 1000 births. The rate of mortality from tuberculosis (persons), which was 1352 per million living in 1913, was 1062 in 1923. This story is repeated in so many lines of the figures, the improvement is so general that one is reminded of Polycrates and seeks for a ring to sacrifice, for some sign of a deterioration which may propitiate the envy of the gods. Of course, the layman will find it without any seeking in the advancing death-rate from cancer; more deaths from cancer occurred in 1923 (22,065 men, 26,603 women) than in any previous year; the death-rate was 19 per cent. higher than in 1913. Yet the gods may think the sacrifice insufficient, for at the later ages of life, the ages when mortality from cancer becomes considerable, the general death-rate has been reduced very greatly. For instance, 48 per cent. of deaths of males from cancer, and 46 per cent. of deaths of women from cancer, occurred between the ages of 45 and 65. Taking as the standard of comparison so recent a year as 1913, we find that the death-rate in 1923 of males aged 45–55 years was 74 per cent., and of males aged 55–65, 78 per cent. of the rates in 1913; the percentage ratios for women are also 74 and 78. The increase in rate of mortality from cancer is so much over-compensated by the decreased risk of dying from other causes that even at the cancer ages the likelihood of dying at all within a year is less than it has ever been. It is hardly necessary to suppose that our bad habits of drinking hot tea, paying no heed to our colons, and generally neglecting the warnings of prophets within and without the medical profession, have really increased the powers of the cancer dragon; but that it really is a dragon can hardly remain in doubt after a visit to the British Empire Exhibition. For suppose a population of distressed damsels exposed to the ravages of a dragon and of a well-directed battery of machine guns; then since, according to the best mediæval authorities, dragons only devour living maidens, the rate of mortality per machine gun is likely to exceed the mortality *per draconem*. Now expose a population of the same size, or larger, to a dragon of equal appetite and no competitors, then, unless we suppose that the old dragon ate not only as many as he could but also as many as he would, the new rate of dragon mortality will be absolutely as well as relatively much higher than before. In fact, even an increasing *rate* of mortality from cancer, if associated with a decreasing rate of mortality from all causes, does not involve as a logical consequence any absolute increase of cancro-genetic factors at all. Perhaps then we should seek our object of sacrifice in the increasing mortality from encephalitis lethargica, and in the still large attribution of deaths to influenza; the number dying from the latter in 1923 was much smaller than in 1922, but exceeded 8000. Indeed, it cannot be proved that the development of some new infection or the transformation and increase of virulence of some old infection might not bring back the rates of mortality of 50 or 100 years ago. Such a thing has happened before; England in the fourteenth century, Rome in Justinian's time no doubt had far higher death-rates than in earlier times. The thing *may* happen; but the most pessimist philosopher would hardly aver that it is likely to happen, having regard to the relatively small success of the onslaught in 1918 of influenza and the recovery made by our general death-rate since then.

[1] The Registrar-General's Statistical Review of England and Wales for the Year 1923. Tables, Part I., Medical. H.M. Stationery Office. 15*s*.

DENTAL DRESSERS IN DERBYSHIRE.

THE Derbyshire scheme for dental treatment by means of school dentists, aided by dental dressers who have had 12 months' training at school clinics and who act only under the personal supervision of a registered dentist, appears to have worked well, judging from the tables of comparative statistics for various counties given in the annual report of the school medical officer for 1923. Nevertheless, the scheme may lapse at the end of this year unless the Order issued by Sir Alred Mond in August, 1922, is modified. Dr. Sidney Barwise pleads for an extension of the time-limit until more dentists are available. He outlines the New Zealand scheme, which differs in important particulars from that in Derbyshire; for in New Zealand dental dressers after two years' training in a dental hospital may work quite apart from the registered school dentist. Indeed, there are in the New Zealand Service only eight qualified dentists. The difficulty appears to be purely a question of coping with the enormous amount of work involved in the treatment of the teeth of our large school population. There is, evidently, no fear of the work being scamped, provided the services of the right type of registered dentist are available for supervision and training. The testimony of dentists of the highest standing who have been in constant touch with the work of these dressers, and the X ray photographs of fillings reproduced in the report, are ample guarantee of the quality of work done. At present there are not sufficient dentists to go round, and there is little prospect of the number increasing to an extent sufficient for the country, more especially the rural districts, while children's teeth are in a notoriously bad state, 80 per cent. at least of the school population requiring treatment. The Derbyshire scheme is running smoothly and effectively, and the teeth of the Derbyshire children are being properly attended to—the numbers given in the comparative tables speak for themselves—so that it seems a pity to disturb the scheme until an adequate substitute is available. The dental dressers are well-educated intelligent girls of matriculation standard; they work only under the personal supervision of a registered dentist, and Dr. Barwise is of opinion that their work should not be limited to "cleaning and polishing, applying or removing dressings or temporary fillings, charting, recording, and work of like responsibility" as laid down by the Mond Order, but that they should be allowed to continue doing the dental work of a routine character such as (*a*) the examination of children's teeth with a probe and mirror, (*b*) extraction and treatment of temporary teeth, (*c*) treatment of the first permanent molars, the remaining responsible work being left to a registered dentist. The trouble is, Dr. Barwise says, that unless the dental dresser is allowed to do those things she is really not of much use. A registered dentist under the new Order may undertake operative work while supervising the work of two dental dressers. If not operating he may supervise the work of six dressers, all cleaning, polishing, applying or removing dressings or temporary fillings, charting, and recording, but meanwhile no one is doing the permanent fillings or extractions which make up the bulk of the school

medical work. By preventive measures, that is by intensive work on the younger age-groups, it ought to be possible in a few years to reduce the operative work necessary among school-children to dimensions proportionate to the number of dentists available, but at present owing to the enormous demand of the older children in a great many districts this is quite impossible. The Derbyshire scheme meets this situation and is devoid of possible abuse, for the dental dressers are trained at the school clinics by the school dentists, and there is no possibility of their ever establishing themselves in opposition to the registered practitioner.

A BIOGENETIC VIEW OF INSANITY.

DURING the period 1901–13 the admissions to the mental ward of the Eastern District Hospital, Glasgow, included some thousands of insane patients who were treated under hospital conditions without certification. An account of this enterprise, and of its bearing on the great problems connected with the treatment of the insane, was given by Dr. John Carswell in a Maudsley lecture[1] delivered before the quarterly meeting of the Medico-Psychological Association in May last. Since proposals for instituting similar treatment in England are under consideration and trial at the present time in various places, the conclusions drawn by Dr. Carswell demand investigation. The statistics referring to patients are composed of figures so large that their significance is, at least on that ground, unassailable. They show that there was no important variation in the ratio of insane to the total population throughout the period during which the experiment was under trial, and that the incidence of insanity was not remarkably greater in districts with a death-rate above the average for the city than in those, presumably healthier and better-to-do, areas whose death-rate was below the normal. These figures refer to the age-period 15–45, but over the age of 45 the incidence of insanity is considerably higher in the poorer districts (assuming that a high death-rate indicates poverty). Now, Dr. Carswell regarded the large majority of his cases under 45 as due to "constitutional instability," by which he appears to mean a congenital, as opposed to an environmental, cause, and from the foregoing data it would appear that hereditary causes are equally operative among the poor and the well-to-do. On this ground he opposes the contention that "improvement of social conditions means the preservation of the unfit, and consequently a higher producton of insanity." Here we are on ground common to medicine and statesmanship, contentious enough even at the present time, and closely connected with the problem of over-population, which bids fair in time to overshadow every other political issue. For that reason Dr. Carswell's contribution is the more welcome. But perhaps the question is not as simple as he would have us believe. It has not been shown, for example, that physical and mental "unfit"-ness are parallel phenomena, nor do the "eugenic" arguments to which he takes so strong an objection refer solely to the latter type. If there is any sort of mental disorder notably more common in the lower classes than in any other, it is that of the minor degrees of mental defect, often compatible with an efficient life of manual labour, but precluding any more skilled or responsible work; these men and women are outside the scope of Dr. Carswell's figures, because they never receive institutional care. The reply of the eugenist to Dr. Carswell would be that his object is to eradicate the mentally defective and unstable from any and every class; "better social conditions" are only deplorable in this sense, in so far as they enable the mentally defective to propagate freely, a qualification which demands much closer consideration of what exactly is involved in these better conditions. Nor can we unreservedly accept Dr. Carswell's statistics as to ætiology. "Constitutional disability" (adolescence, congenital defect, heredity, epilepsy, and the climacteric), "toxic causes" (syphilis, alcoholism, exhaustion states, and the effects of acute bodily diseases), "gross brain diseases," and "senile changes," are held so largely accountable for his 909 cases of well-ascertained ætiology that "all other factors in the production of insanity are practically negligible as contributory elements in the total mass of insane persons." Do we really understand insanity as well as this dogmatic statement would imply? It has been said that a man may have syphilis and a broken neck; may it not also be said that a man may be an alcoholic, or exhausted, or convalescent from an acute bodily illness, and yet become insane from quite another cause? In extending the hypothesis of "biogenetic" origin to most forms of insanity occurring before the age of 45, Dr. Carswell presents insanity in the light of an affliction singularly unamenable to the prophylactic measures which are summed up in the expression "mental hygiene." We believe that to discount the psychogenic element in acquired insanity, to accept any obvious antecedent morbid conditions as a sufficient explanation for it, is to go far beyond our knowledge of its real origins, and with every respect for the magnificent volume of work represented in these figures, it must be submitted that, to the extent that they depend on views of ætiology, the conclusions to which they lead can only be accepted with reserve.

[1] Journal of Mental Science, July, 1924.

THE PHOTOGRAPHIC EXHIBITION.

THE sixty-ninth annual exhibition of the Royal Photographic Society, opened at the galleries of the Society, 35, Russell-square, W.C., on Sept. 13th, is a very brilliant one, well in advance of its immediate predecessors and a remarkable contrast to those with which we were familiar before the war. The contrast has particular reference to the striking advance made in the application of photography in various technical directions, in medicine and in science generally, in trades and manufactures in an infinite number of ways. Whilst the pictorial side of the art has not been neglected, the scientific and technical section now represents the greater part of the exhibition. It is amusing and instructive to remember that some 12 or 15 years ago this section occupied a few feet of wall space in a remote corner of an unimportant room, where it was overlooked or charitably tolerated as "interesting." One misses some of the amenities of the old exhibitions when the larger space of the New Gallery permitted the trade exhibits of apparatus and demonstrations of certain processes. At the Society's house there is inevitably some overcrowding and an almost bewildering wealth of exhibits, although the dealers are limited to advertising pictorially the capabilities of their productions. Photography has always been popular among medical men, partly as a hobby, partly as an opportunity to secure exact records, whether of specimens or cards, or as photo-micrographs, or, in more recent times, on the radiographic side. Some particularly fine specimens are exhibited by Dr. G. H. Rodman, past President of the Society. His photo-micrographs of sections of human muscle affected by trichiniasis show the cysts very clearly in situ and afford an opportunity of seeing what is in this country a rare condition. Dr. G. S. Sansom, who also distinguishes himself on the pictorial side with some excellent transparencies, has some photo-micrographs of embryological subjects. The radiograms of Dr. G. Baer, of Zurich, are instantaneous studies of the duodenum after an opaque meal; they are taken at frequent intervals and so afford a kinematographic demonstration. There are a large number of radiograms from negatives made at various hospitals in Great Britain, but particular attention may be directed to a pair showing the lungs in full inspiration and expiration respectively. Although a certain amount of criticism always attaches to photographic results which are at the same time made semi-diagrammatic, in these examples the diaphragmatic movements, the lighting up of the apices, and

the general appearance due to pulmonary expansion are most instructive. Apart from the purely professional side there is much in the exhibition of general interest to appeal to any medical man whatever his tastes and hobbies. The exhibition will remain open until Oct. 25th from 11 A.M. till 9 P.M. daily (Sundays excepted), and it may be added that admission is free.

AN INFECTION WITH ALL THREE MALARIAL PARASITES.

MALARIAL infections vary greatly in their amenability to treatment by quinine, although opportunity seldom arises to prove this in the history of a single case. Hence the particular interest of a report by Dr. Kadri Mehemmed,[1] a medical officer in the Turkish Army in Asia Minor, on a patient in Cilicia who complained of pain in the abdomen, diarrhœa, and daily attacks of fever, with a long history of malaria. When his blood was examined next day a severe infection with both benign tertian and quartan was found, and a slighter infection with subtertian crescents. Two days later he was put on quinine, 15 gr. daily in four divided doses. Eighty hours later, after the patient had taken 52 gr. in all, no benign parasites at all were observed, but only deformed quartan parasites and crescents. The patient was put on 15 gr. daily for seven days, thereafter on half doses, and after three weeks' treatment only crescents and very few of them were to be seen; the diarrhœa had ceased, and the spleen had become normal in size. The after-history of this case should be interesting, for although in the early stages of infection the benign tertian parasite is the form most easily dealt with by quinine, the successful treatment of a relapsing case is one of the most difficult problems in malaria; relapses are apt to continue in spite of the use of quinine in full doses. Dr. Mehemmed's patient was fortunate if the check to infection was lasting.

MONOGRAPHS OR SYSTEMS OF MEDICINE.

THE multiplication of medical literature and the increase in known facts concerning medical science have in recent years produced a situation which must be full of embarrassment to both donor and recipient, for many special works are available, and the data have become at the same time so unwieldy that even the best of general books is bound to have omitted many important facts. There is evidence that editors to-day shrink from the complexity of attempting to bring out new text-books of medicine, but we have been able in our review columns to welcome several daring and successful ventures in this respect. Dr. E. P. Poulton's revision of "Taylor's Medicine," and Dr. Frederick Price's "System of Medicine," may be quoted as illustrations. But a system of medicine in many volumes is an even more difficult task; it cannot be attempted without the collaboration of many writers, and it is almost inevitable that the work must in some respects be out of date before it reaches the reader's hands. In France this difficulty is to some extent met by issuing finished volumes as soon as each is completed, and it is noteworthy that no less than three different systems, one of which will have when completed more than 30 volumes, are appearing in this manner from Paris. In our review columns to-day will be found an account of a new "System" recently published in the United States; whilst apparently not free from the defects which must occur in any work of these dimensions, this ten-volume series contains many remarkable chapters on different aspects of disease. It has the advantage of being issued in a leather binding with the pages held together by the loose-leaf system, a feature which we believe was first introduced into medical literature in "Oxford Medicine," a six-volume work by various English and American writers which was published by the American branch of the Oxford University Press, under the general editorship of Prof. Christian and Sir James Mackenzie. The new ten-volume work, whose title is "Tice's Practice of Medicine," introduces a further novelty in the form of an annual supplement by which subscribers can each year receive new pages to be incorporated in the text so as to bring it completely up to date.

To possess such works as these is to possess a library; the cost is necessarily great, and would allow the purchaser, for the same expenditure, to buy a series of standard works whose contents might, perhaps, more fully cover the field of medical science. But there is certainly something convenient in the possibility of preserving the subject-matter under a series of uniform covers, and for this reason we believe that the loose-leaf method will enjoy popularity.

[1] Archiv für Schiffs- u. Tropen-Hygiene, June, 1924.

PROF. PAVLOV'S SEVENTY-FIFTH BIRTHDAY.

Ivan Petrovitch Pavlov, the great Russian physiologist, attains on Sept. 27th his seventy-fifth birthday, covered with distinctions and international honours. At Leningrad the event will be celebrated by the publication of a *Festschrift* in the form of a special number of the *Archives of Biological Science*, the official organ of the Institute of Experimental Medicine, of which Pavlov is honorary director. Appropriately, we have received from one of Pavlov's former colleagues, Prof. W. N. Boldyreff, who is now Director of the Pavlov Institute of the Battle Creek Sanitarium, U.S.A., an interesting biography of the man who may be said to have raised physiology to the level of an exact science. Prof. Boldyreff divides Pavlov's studies into three groups: investigations on (1) the heart and circulation of the blood; (2) the digestive system; and (3) the physiology of the brain and the organs of sense.

In the first period of his scientific work he studied in detail the innervation of the blood-vessels and of the heart. As a result of this, he brought out a report on the work of the special branches of the vagus nerve. In 1885, and earlier (1877), he published papers on the accommodating mechanism of the blood-vessels. Even at that time he was interested in the physiology of digestion and published some excellent articles on this subject, among them being papers on the nervous mechanism of pancreas juice secretion (1878). During the same period, under the guidance of Ludwig, Pavlov reported studies on the innervation of the left ventricle of the heart and, in collaboration with Heidenhain, he fully investigated the nerve-muscle mechanism of the opening and closing of the operculum of the snail. Early in his scientific career (1879) he described a new method of operation for the pancreas fistula. In 1890 he made his discovery regarding the influence of the vagus nerve upon the process of secretion in the gastric glands. Simultaneously he invented his method for obtaining the gastric juice of dogs, the famous "sham feeding method." The results of these discoveries were so interesting and encouraging that he turned his entire time and interest to the study of the nerve-physiology of the digestive organs, and shortly thereafter he perfected his method of operation for the isolated stomach-pouch. To Pavlov we also owe our knowledge of the influence of the vagus and sympathetic nerves upon the secretion of the pancreas and two excellent methods for demonstrating the mechanism of the action of these nerves. The first method is to excite the sympathetic nerves by mechanical stimulation with the Heidenhain tetano-motor. The second method involves a special operation on the animal by which, with the automatic stimulation of the vagus nerve by the Dubois-Raymond inductorium, the secretion of the pancreas is obtained.

In his preface to the biographical sketch Prof. Boldyreff tells of the hardships Pavlov was forced to undergo as a consequence of the Russian revolution in 1917. The great scientist, he says, who had done

so much to relieve the sufferings of others, was himself compelled to suffer want and hunger, and, at an advanced age, to spend the time and energy so valuable to science in manual labour to provide food for his family, in addition to performing the humblest domestic duties and household drudgery. In spite of these efforts, especially in the years 1920 and 1921, he and his family suffered severely from the lack of food due to the bad harvest in Russia. During this time he was helped as well as cheered by the contributions of his scientific colleagues in foreign lands, who made great and persistent efforts to send him aid at a time when such a multitude of eminent Russian scientists and thousands of the common people perished from starvation and disease. In the midst of all his tribulations Prof. Pavlov's courage and fortitude never failed him. He even continued his scientific work in the face of great difficulties; and surrounded by his faithful though hungry pupils, hungry himself, in an unheated building, with water pipes frozen and no light other than that from burning faggots, he encouraged and inspired his assistants by his courageous example in continuing the important scientific work to which his life has been devoted.

BENIGN TUMOURS OF THE PLACENTA.

IN a recent communication to the Chicago Gynecological Society, Dr. R. A. Scott,[1] of the obstetrical service of the Evanston Hospital, Illinois, records an illustrative case, with a review of the literature, of benign tumours of the placenta. Yamato in 1913 collected 116 cases, in addition to which Dr. Scott has found reports of 36 other cases. The first case on record, of which an interesting extract is given, was reported by John Clark in the Philosophical Transactions of the Royal Society in 1798. The tumours are generally found in the midst of the placental tissue in the chorionic membrane, protruding as a rule on the fœtal surface of the placenta. The majority are encapsulated. The tumours consist of sharply defined nodules of lobulated structure, connected with the chorionic epithelium by one or more pedicles and with the rest of the placental tissue in various ways by secondary fibrinous adhesions, lying in the intervillous space and touching neither the chorionic epithelium nor the decidua directly. The tumours are usually solitary, but multiple growths have been observed. The majority of patients are under 30 years of age and primiparous. The health has usually been good before and during pregnancy. There was not a single instance of maternal syphilis in Yamato's series of 116 cases. In size the tumour usually varies from that of a walnut to that of a kidney, but in a few instances the tumour has covered two-thirds of the placental area. It appears to play little part in the pathology of labour. The chief microscopical features are the embryonic connective tissue and the cavernous capillary proliferation. The chorionic epithelium is involved only secondarily in the proliferation, and is an entirely subordinate menace. Dr. Scott's patient was a primigravida aged 32 years. The pregnancy was normal, the urine negative, and the blood pressure 118 mm. Labour took place spontaneously at full term, delivery being effected by low forceps. The placenta was expelled 15 minutes later by the Duncan method. The baby weighed 6 lb. 12½ oz. and was in good condition. Examination of the placenta, which measured 20 by 18 by 3 cm., showed a dark-red firm mass of uniform tissue, measuring 5 by 4·5 by 2·5 cm. and weighing 70 g., situated opposite the attachment of the umbilical cord and in the placental substance. The mass was encapsulated and could be shelled out of its capsule. On microscopic examination multiple blood-vessel spaces of irregular size were seen filled with blood and lined with epithelium. Most of the blood-vessels had thin walls, but occasionally there were groups of large thick-walled vessels resembling arteries. The diagnosis was hæmangioma of the placenta.

[1] Surgery, Gynecology, and Obstetrics, August, 1924.

THE RECOVERY OF THE VOLUNTARY HOSPITALS.

THERE was a brief period, after the war, when the outlook for the voluntary hospitals of this country seemed dark. The repeated story of accumulated dilapidations, rising salaries, and soaring cost of renewing equipment, depressed even enthusiasts for the voluntary system, and rumour had it that complete recovery was hardly to be looked for. At this stage, when enterprise was constantly being embarrassed and baffled by difficulties, the Government stepped in and offered the sum of £500,000 as a special emergency grant to be administered only to those hospitals which showed a lively disposition to help themselves. The Voluntary Hospitals Commission, who were appointed in 1921 to distribute this sum, were instructed, after the settlement of some urgent claims, to disburse money only pro rata against new money raised or about to be raised by the charity. This stringent condition, which has doubtless led to hardships in individual cases and has been sharply criticised, has justified itself. The second interim report of the Voluntary Hospitals Commission, which has just reached us, leaves no doubt whatever on this point, or that the timely stimulation has brought about a wonderful recuperation if not indeed a cure. It will be remembered that the first interim report of the Commission[1] recording the distribution of £372,000 was published in February, 1923. By March 31st of that year a further £55,000 had been allocated, leaving £73,000 to be used to assist those hospitals with serious accumulated deficits. A sum of £46,000 was allocated to England and Wales and £27,000 to Scotland. Local committees were asked to submit proposals for distributing the sum allocated to their area among the hospitals within it, and they were also urged to raise county funds, in order to facilitate compliance with the Treasury condition as to new money. The supplementary distribution proceeded, with the help of the local committees, until the latter part of 1923, when it was decided that the sum of £16,866 still at the disposal of the Commission should be distributed so far as possible to assist hospitals which were in acute financial difficulties, but for various reasons had been unable to receive an adequate measure of assistance from the Government grant. This final distribution was made easier by a special concession granted by the Treasury. Under an amending regulation the Commission were given a discretion to waive the condition as to new money in exceptionally hard cases, and were able to make grants to a few deserving hospitals which could not otherwise have been assisted. The sum distributed, however, without requiring the equivalent amount of new money to be raised, was only between £6000 and £7000. A complete detailed list of all the grants paid to hospitals is given in appendices. The Commission praise the local voluntary hospital committees, who in most of the areas have assisted in organising and coördinating the raising of funds, and have secured, inter alia, the adoption of a uniform system of accounts. Some of these committees have issued valuable reports[2] in which they have envisaged the hospital needs of their area as a whole and have indicated the possibilities of coöperation between the institutions in the area. Having completed the distribution of the grant, the Commission are now directing their attention, at the request of the Minister of Health, to the need for additional voluntary hospital accommodation and the best means of providing and maintaining it, and not till this investigation is completed, and perhaps not then, will their task be finished. The fact that an inquiry into the provision of more beds seems worth pursuing is sufficient answer to those who are still gloomy about the prospects of maintaining the present quota of voluntary hospital beds. The comment on the present

[1] See THE LANCET, 1923, i., 446.
[2] See THE LANCET, 1923, i., 969.

financial position of the hospitals in the final section of this interim report is that "there is substantial ground for the hope that the voluntary hospitals will, for the most part, be able to balance their budgets. They are actively exploring the possibilities of securing additional income and in general the deficits appear to be decreasing. In some instances the recovery has been astonishingly rapid, and the situation as a whole is decidedly more hopeful than we had any reason to anticipate when we began our work. We believe that the recovery of the voluntary hospitals will continue, and that their financial position is approaching a more stable and satisfactory condition." This is a more encouraging statement than anyone could have anticipated in 1921.

MENTAL SERVICES OF THE M.A.B.

THE Mental Services Section of the report of the Metropolitan Asylums Board, summarised on another page, is enriched by a review of work undertaken at Caterham Mental Hospital laboratory, by Dr. J. Leslie Gordon, and by four original articles of unusual merit, notably on the Diagnosis of Mental Deficiency, by Dr. E. B. Sherlock; on Syphilis as an Ætiological Factor in Mongolian Idiocy, by Dr. R. M. Stewart and Dr. D. O. Riddel; on An Application of the Methods of Industrial Psychology to Mentally Defective Persons, by Dr. P. D. McGowan and Dr. John Ross; and on Cases Illustrating the After-effects of Encephalitis Lethargica, by Dr. Charles Glen. In the first of these Dr. Sherlock criticises the well-known "Intelligence" tests, and suggests the application of tests designed to investigate capacity for sensation, memory, and reasoning. He gives examples of questions, ingeniously framed to eliminate guesses, designed to help an examiner to judge the extent to which the defective appreciates time, causal, spatial, and other relations. In some cases the mere ability to understand the question put may supply evidence that the relation involved is appreciated. About the tests there is an illusory appearance of simplicity. For example, the first question under the heading Spatial Relation proposed in the sample scheme is: Draw a straight line and then mark it so that one part shall be twice as long as the other. As originally planned, the wording of this question was "Mark the middle of this line," but this proved so easy for feeble-minded persons that the test given above was substituted. Yet, as shown by H. K. Wolfe, the apparently simple business of marking the middle point of a line raises all sorts of issues in reference to the influence of the age, sex, and experience of the person tested, the length or direction of the line, the variability of error, and so on. Again, though either test will do as a means of detecting the ability to cognize a relation, there has been found little correlation between the "static" form of spatial perception required for the estimation of the lengths of two portions of a line and the "dynamic" form involved in drawing a line of a given length. Actual employment of the tests has brought out unexpected possibilities of error, misunderstanding, novel implication, or legitimate difference of opinion. In order that there might be collected some evidence bearing upon the actual utility of the tests, they have been applied to (1) a group of boys at a preparatory school; (2) groups of higher-grade male and female children at Darenth Training Colony; (3) a group of female nurses; (4) sundry persons casually met with in daily intercourse. The results have been found full of interest and with a considerable measure of value. Dr. Sherlock doubts whether these tests will lend themselves to any process of standardisation on an age basis, but suggests that if the principles underlying them are accepted as sound, they seem likely to be of assistance in arriving at a decision upon the extent of a person's need for "care, supervision and control." They are, at any rate, not purely empirical, but serve for the measurement of a fundamental process of thought, the cognition of relations. We recommend all those interested in the progress of mental hospitals to study this section of the report, which can be obtained separately (price 1*s.*).

VASECTOMY IN GERMANY.

A SHORT note in the *Deutsche Medizinische Wochenschrift* for August 15th by Dr. Lævy-Lenz, under the heading of "Zur Technik der Ambulanten Steinach-Operation," gives the impression that this operation is being performed on a large scale in Germany. Dr. Levy-Lenz speaks of a personal experience of some 50 cases, the use of the word "some" suggesting that a few Steinach operations more or less hardly count. He betrays no great enthusiasm for the results and admits that he has seen no improvement when the operation has been performed for normal old age. But when old age has been premature and has been associated with slight mental depression, he has known the operation to be beneficial. As for the observations of other surgeons, he finds that opinions differ widely. This, he thinks, may be because some surgeons have been more discriminating than others in their choice of patients. But the most striking feature of Dr. Lævy-Lenz's note is his description of the ease, facility, and rapidity with which vaso-ligature, according to Steinach's technique, is now being performed in Germany. It seems to have become an out-patient or consulting-room incident. The operation, we are told, is perfectly free from danger at the time and also from unpleasant sequels. All that is needed for it are scissors, a knife, two surgical forceps, a stout probe, silk, a needle, a one-tooth hook forceps, and a local anæsthesia outfit. The vas is gripped through the skin of the scrotum as near to the testicle as possible, is isolated from the other constituents of the cord, and is secured in a longitudinal fold of the skin. The skin is disinfected, the local anæsthetic is injected, and a 2 cm. long incision is made over the vas, which is laid bare and pulled forward with the help of the probe. It is then ligatured at two points with silk and divided. The wound in the skin is closed, a small dressing is applied, and a suspensory bandage is worn for 14 days. Dr. Lævy-Lenz says that the whole operation takes from five to ten minutes, but that, apart from a transitory "flare-up," results should not be expected till four to six months after the operation.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

A. L. McDonnell to be Surg. Lieut.

Surg. Capt. R. W. G. Stewart to *President*, for post-graduate course.

Surg. Comdrs.: E. S. Wilkinson to *Ramillies*; G. B. Scott to *Resolution*; W. W. Keir and H. St. C. Colson to *President*, for survey of medical stores at R.N. Medical Depôt, Deptford; D. H. C. Given to *President*, for post-graduate course; G. B. Cockrem to *Despatch*; and R. Thompson to *Marlborough*.

Surg. Lts.: W. J. McB. Allan to *Ramillies*; S. G. Weldon to *Marlborough*; and Surg. Lt. (D.) H. J. Luck to *Malaya*.

Surg. Lt.-Comdrs.: A. W. Gunn to *Centurion*; P. W. Carruthers to *Impregnable*; and I. S. Gabe to *Fisgard*.

C. C. Grummitt has been appointed Admiralty Surgeon and Agent for Hove, in addition to Brighton.

ROYAL ARMY MEDICAL CORPS.

Capt. Alexander S. Newton to be temp. Capt. whilst empld. as a Dental Surg.

ARMY RESERVE OF OFFICERS.

Lt.-Col. H. A. Harbison ceases to belong to the Res. of Off. on account of physical unfitness.

TERRITORIAL ARMY.

C. Alison (late R.A.M.C.) to be Lt.

INDIAN MEDICAL SERVICE.

The King has approved the retirement of Lt.-Col. W. H. Kenrick.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

LXXXVIII.

TREATMENT OF EPIDEMIC ENCEPHALITIS (ENCEPHALITIS LETHARGICA).

THE early diagnosis of epidemic encephalitis is of importance, not because there is a specific treatment as in diphtheria, which must be given early to be effective, but because some of the conditions which simulate it, such as intracranial tumour or abscess, cerebro-spinal fever, cerebral syphilis, uræmia, and various drug poisons, call for quite other treatment, the delay or omission of which may be of serious import. Conversely also, some cases of encephalitis may easily be mistaken for other conditions. Painful abdominal myoclonus has been diagnosed as an acute emergency, and laparotomy performed in consequence; whilst the curious moral changes of behaviour, which so often occur in children as the result of this infection, have in some instances been dealt with as wilful naughtiness with most unhappy results. A definite diagnosis cannot, however, be made until characteristic nervous signs show themselves. Early or premonitory general symptoms may be present in some cases for days, in others for weeks, but there is nothing distinctive either in their character or in their grouping. Thus by the time that its presence is recognisable the poison has already reached the nervous system.

Disinfection.—It is believed that the primary site of infection is the mucous membrane of the mouth and naso-pharynx. Measures may therefore be taken to disinfect these regions from the first. Potassium permanganate solution (1/1000) was found by Levaditi to be particularly effective in destroying his virus under experimental conditions, and there is thus some justification for preferring it for this purpose.

Rest.—Rest in bed is clearly indicated in severe cases, and in them not difficult to enforce, but it is sometimes not easy to persuade a patient suffering from nothing but a slight diplopia to remain in bed for some days. However, the mildest case may at any moment develop into one of serious character. Many fatal cases have for varying periods seemed to be exceedingly mild. Whether any of these would have run a less serious course had they been kept in bed from the first it is not possible to say, but it seems reasonable to insist that any person suffering from an acute infection of the central nervous system should be kept in bed at any rate until the acute stage may be assumed to be over, however slight that infection may appear to be.

Isolation.—The question of isolation is one of considerable difficulty, seeing that instances of direct infection are extremely rare. Theoretically no doubt it is desirable, but practically it is impossible to carry out a complete scheme of isolation based upon our scanty knowledge as to the conditions of transmission, or the period of infectivity. General measures as regards the hygiene of the sick-room should be adopted. At the Sheffield City Fever Hospital, where large numbers of cases have been under treatment during the recent outbreak, those kept out in the open all day appear to have been less excitable and to sleep better.

Diet.—Food should be light and palatable. In the acute restless cases the difficulty of feeding is often as great as in severe cases of chorea, and it is important to make sure that adequate quantities are taken. Some of these cases lose flesh rapidly. The same applies to the very lethargic patients, who will go for hours together without food unless made to take it. Dysphagia from bulbar lesions may add to the difficulties in some cases; it is usually only temporary.

Management of a Case.

Many lines of treatment of the infection itself have from time to time been suggested. Amongst these are the fixation abscess, "pure influenza" antigen, serum from convalescent cases, sodium salicylate intravenously (administered in 1/30 solution, 1 to 3 g. daily). Individual observers have praised these and other remedies, but none has received general support, whilst some have been definitely abandoned by those who previously advocated their use. At the present time various workers in Paris are testing the value of intra-thecal injections of a vaccine prepared from the central nervous system of rabbits infected by the virus which Levaditi obtained from the brain of a human case. The results are said to be encouraging, but they are still too few and uncertain to warrant undue optimism. In some of the cases so treated an undesirable meningeal reaction has occurred, and it seems doubtful whether repeated lumbar puncture in this disease may not itself be actually harmful. Some believe that it should be avoided if possible, and never performed in cases where the diagnosis is obvious; others, however, consider it is of therapeutic value in the relief of lethargy and other symptoms. Probably the most generally used drug, on theoretical grounds, is hexamine, given in full doses (10 gr. t.d.s.) over considerable periods, during which the urine should be examined daily for signs of irritation of the kidneys.

In the acute restless cases, with choreiform movements, careful nursing is essential. It is important to protect all parts liable to be chafed by the patient in his violent movements, since otherwise intractable sores may be produced on the elbows, knees, ankles, and elsewhere, even in a single night. Patients may at any time become extremely violent, and assistance should always be readily available. In some cases the use of a restraining sheet may be necessary. Sponging, ice-bags, or cold affusions to the head may be tried, the last-named being the most effective. (Tepid, cold, or even iced water is freely sponged over the head, face, and neck for about ten minutes every four hours. In males the hair should always be cut quite close; in females, only in very severe cases.) Sedatives in full doses are usually required. Bromide and chloral hydrate or chloretone, used alternately, have proved the most generally useful. If these fail, recourse must be had to an injection of hyoscine hydrobromide (gr. 1/200 to 1/100), which usually gives temporary relief. As a rule, this acute stage, if not fatal, diminishes in severity in a few days, sometimes with remarkable suddenness and independently of any particular treatment; this is a point to be borne in mind in assessing therapeutic values. In a few cases the maniacal symptoms may call for removal to a mental hospital in the interests of the patient.

Intense neuralgic pains in the head or elsewhere may occur at onset, and persist with extreme severity in spite of treatment. Drugs, such as antipyrin, phenacetin, aspirin, butyl chloral, gelsemium, bromides, &c., upon which reliance is usually placed in similar circumstances, often fail to produce any effect in these cases, and opium, in the form of Dover's powder, or morphine may be required from time to time. Myoclonic spasm may be extremely painful, and lead to great exhaustion and distress. Local pressure by pads and bandages, hot fomentations, and anodyne liniments are usually of little avail. Emplastrum sinapis applied to the epigastrium is occasionally useful. In severe cases morphine is required. The administration of an anæsthetic has at times been the only means of giving temporary relief. One or two observers claim success with

injections of 10 c.cm. of the patient's own spinal fluid, but it must not be forgotten that the abdominal spasms which cause such acute pain when they first appear usually cease to be so painful after a few days, and that gradually the spasms may occur almost painlessly.

For the attacks of disordered breathing (polypnœa, dyspnœa, &c.), which often cause considerable alarm when they first occur, oxygen may be administered with good effect. In most cases a confident assurance to the patient and his friends that they are not dangerous and a simple sedative will suffice.

In the acute stage troublesome constipation often requires attention; frequent soap-and-water enemata may be useful. The tongue may remain foul and coated for longer than the general condition appears to warrant, when ordinary methods of local cleansing should be employed.

After-Treatment.

After-treatment may demand great patience and endurance. When once the acute stage is over, say in two to four weeks, there does not seem to be any necessity for complete rest in bed. Many cases remain weak both mentally and physically for very long periods, and require a long rest before returning to work. A sea voyage, a holiday abroad, a quiet retreat in the country, at the sea, or even at home, whatever course is decided on, must be designed as a real rest for the mind, and must therefore be congenial to the patient. In some cases motoring has proved effective.

The *Parkinsonian syndrome* as a sequela presents great difficulty in treatment. Massage, hydrotherapy, and passive movements have been advocated, and in some cases give a certain amount of relief. Electrical applications appear to give no benefit, and in some cases to do harm. Various drugs have been recommended, including arsenic, luminal, belladonna, and tincture of arnica. Scopolamine undoubtedly relieves the tremor and rigidity for a time, but has no permanent effect. Its use cannot be continued for long periods. After choreiform attacks recovery may be considerably hastened by the judicious employment of regulated exercises. For this purpose simple callisthenic arm exercises may be carried out, or, in small children, building with toy bricks. At the City Fever Hospital, Sheffield, Dr. Egerton Williams has obtained rapid improvement in older children by getting them to knit.

The most disturbing sequela is perhaps the peculiar nocturnal excitement and insomnia, which, though not limited to children, reaches its highest grade in them. In most cases much may be done by judicious control and "good mothering." Even then sedatives are often required as well. Of these, bromide and chloral hydrate, or chloretone seem to be the most generally useful. The method of injecting small quantities of milk intramuscularly, which was first suggested by Lust of Karlsruhe, has proved effective in many of our cases; 2 c.cm. of boiled milk are thus given at bedtime, and the child usually goes to sleep in an hour or two, and sleeps soundly for six or seven hours or more. Nor is its action limited to children. In the case of a man who had not been able to sleep until 3 or 4 o'clock in the morning since his acute attack five months ago, intramuscular injections of milk given at 9 o'clock each night for a week produced sound sleep from 10 till 5 next morning. Preliminary injections of distilled water in similar quantity at the same hour had failed to have any effect. It does not always succeed, but should be tried in any obstinate case. In some cases a change to the seaside or country, with plenty of exercise in the fresh air, will give temporary relief, but a relapse on returning to home conditions is not uncommon.

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Special Articles.

THE RESPONSIBILITIES OF THE M.A.B.

THE annual report[1] of the Metropolitan Asylums Board contains, as usual, a historical summary of the evolution of this great organisation and a clear account of the manifold duties it performs for the 28 parishes and unions which make up the Metropolitan Asylums district. To maintain this service, ratepayers at Hampstead combine with residents in unfashionable Wandsworth; Kensington in the West gets as efficient but no better service than does Limehouse in the East.

The Board is composed of 73 members, 55 being elected by the metropolitan boards of guardians and 18 being nominated by the Ministry of Health. Their duties include the provision and management of hospitals and other institutions for infectious diseases, tuberculosis, children suffering from specified contagious diseases and those requiring special treatment in general hospitals or convalescent homes, mental defectives and epileptics, training boys for sea service, and for casual poor; they also provide ambulance and transport services.

Of these activities the fever hospitals and the ambulance and transport service are best known to practitione s as being available for use by the public apart from Poor-law cases, but it is not generally realised how numerous are the contingencies affecting the public which the Board now has to meet. A list given in Appendix III. of the report divides the several classes of persons for whom the Board is now required to provide accommodation into (*a*) the mentally afflicted and epileptics, (*b*) the physically afflicted, (*c*) healthy classes, and this method of classification shows how wide are their responsibilities.

The Mentally Afflicted.

Harmless Poor-law imbeciles of any age, whether regarded as capable or incapable of improvement, have had to be provided for since the inception of the Board in 1867. Since this date also suitable cases certified under the Lunacy Acts transferred from the London County mental hospitals have been received. In 1897 the Board assumed charge of feeble-minded Poor-law children (uncertified), and in 1916 of sane epileptics (Poor-law). From 1917 cases certified under the Mental Deficiency Act, 1913, have been accepted.

It will be seen that during the last 50 years, by formal addition of new classes of persons and, perhaps, still more through freedom in the interpretation of the terms in which the original classes were defined, it has come about that the Board's purview of mental infirmity has extended so as to embrace a wide range of persons. No attempt is made to define the type of lunatic who may properly be detained in the mental hospitals provided by the Metropolitan Asylums Board, which by the Lunacy Act, 1890, are included under the definition of a workhouse.

In practice the Metropolitan Asylums Board now provides in its mental hospitals for: (*a*) Chronic and harmless cases of all forms of insanity; (*b*) idiots and imbeciles who come within the terms of the Lunacy Acts; (*c*) feeble-minded persons as approved by the Local Government Board in 1897 and 1911; (*d*) cases covered by the Mental Deficiency Act, 1913, with certain restrictions.

The distribution of the 9077 beds provided is as follows: Caterham Mental Hospital, 2109; Fountain Mental Hospital, 658; Leavesden Mental Hospital, 2209; Tooting Bec Mental Hospital, 1098; Darenth Training Colony, 2298; Edmonton Epileptic Colony, 355; Brentwood Institution, 350.

At the present time a scheme exists which aims at ensuring the classification of the different types of cases in suitable institutions and the regular movement through the institutions of patients according to changes in age and mental or physical condition.

[1] Office of the Board, Victoria Embankment, London, E.C. 4. Price 5s.

Thus, at the Fountain Mental Hospital are received all children under 7, unimprovable boys up to 9 years of age, and girls up to 16. The children under 7 are watched and classified so that when the time comes those who are thought to be trainable can be sent on to Darenth Training Colony. A few adult female working patients are maintained at the Fountain Mental Hospital. Tooting Bec Mental Hospital is the receiving home for all adult Lunacy Act cases sent by metropolitan boards of guardians, but no cases under the Mental Deficiency Act are received there. Aged patients are retained at Tooting Bec Mental Hospital, but younger ones, after observation, are transferred to the institutions for which they are suitable. Caterham Mental Hospital receives healthy unimprovable adults of both sexes and a certain number of low-grade trainable cases not up to standard for Darenth Training Colony. Caterham also has a large number of children's beds for unimprovable and low-grade trainable children, receiving the untrainable boys over 9 as they leave the Fountain Mental Hospital. Leavesden Mental Hospital may be regarded as an infirmary institution. It accommodates unimprovable adults of both sexes, chiefly those suffering from chronic infirmity not primarily due to old age.

The full statistical tables given of the work done in the mental hospitals present no features of special importance. Dr. G. B. Sherlock, chief medical officer of the Mental Hospitals Service, draws attention to the curious fact that among the 423 deaths recorded in patients who died at the ages of 45 and upwards during 1923, there were only 15 deaths attributed to cancer—i.e., 3·54 per cent. This is not a new feature, since the corresponding figures for the previous four years were 9, 7, 16, and 21 deaths from cancer, the total deaths being respectively 629, 472, 536, and 557. Dr. Sherlock points out that since most of the patients belong to London, a comparison with the Registrar-General's returns for that area is permissible. For 1923 the numbers were: Deaths from cancer (45 years and upwards), 5535; total deaths (45 years and upwards), 33,056, or 16·74 per cent. The reason for this marked difference between the figures for London and those for the Board's mental hospitals is not obvious.

The Physically Afflicted.

Infectious and Contagious Diseases.—The Board have 14 hospitals for infectious diseases, where they provide accommodation for cases of scarlet, enteric, or typhus fever, diphtheria, measles, whooping-cough, puerperal fever, cerebro-spinal fever, ophthalmia neonatorum, trench fever, malaria, and dysentery. All patients suffering from these maladies, whatever their status, are now receivable. Poor-law children suffering from ophthalmia or other contagious diseases of the eye are treated in an institution (White Oak, Swanley) which is a collection of groups of similar cottages, and serves the double purpose of hospital and school. There is room for 360 children, and Mr. E. Treacher Collins acts as visiting ophthalmic surgeon. During 1923 271 children were discharged cured, 240 were admitted, 101 from metropolitan and 22 from extra-metropolitan Poor-law schools, and 117 from London County Council schools. Apparently these are the only sources of admission, and since the reduction in the number of cases leaves vacant accommodation at this hospital, now partially used as a convalescent home, we suggest that the admission of patients from middle-class homes who attend private schools might be worth consideration by the Board, on the analogy of the reception of patients of this class into fever hospitals. Diseases of the skin or scalp in Poor-law children are treated at Goldie Leigh Homes, Abbey Wood; during the year 591 children were dealt with, the large majority suffering from ringworm, and here also the admission of the public other than those coming under the Poor-law might be greatly appreciated. A detailed account of the methods used at this home, giving a proportion of 487 cures out of 513 cases of ringworm, would be of interest. The Infectious Diseases section of the report, taking up 81 pages, is edited by Dr. F. Foord Caiger, chief medical officer of the infectious hospitals service, who besides contributing a note on the protective inoculation by the Schick test and active immunisation against diphtheria of the boys on the training ship *Exmouth*, makes observations on certain of the statistical tables. He calls attention to the lower incidence of scarlet fever and of diphtheria in London, and to the diminution of the death-rate of these diseases from 1·8 per cent. and 8·7 per cent. respectively in 1922 to 1·2 per cent. (scarlet fever) and 6·8 per cent. (diphtheria) in 1923. The last-named figure is still considered too high and could be materially reduced by the earlier administration of antitoxin. Incidentally in a note on the death-rate in diphtheria as influenced by the dosage of antitoxin, which forms one of 16 noteworthy contributions by medical officers to this section of the report, Dr. Margaret Björkegren observes that in so far as inference can be drawn from statistics in so complex a subject, the average optimum dose would seem to be about 20,000 units per patient. Dr. Caiger points out that the incidence of enteric fever is now so small that the disease has been omitted from the charts.

Owing to the low prevalence of scarlet fever it has been possible to devote more beds to the reception of measles and whooping-cough. 1767 cases of measles were admitted during the year with the very low case mortality of 7·7. The whooping-cough mortality, on the other hand, was high—14·6 per cent. of 528 cases admitted. The puerperal fever admissions during the year numbered 78, of whom 15 died. Sir Almroth Wright and his assistants are making trial of the immuno-transfusion[1] treatment on certain of the more severe cases of septic infections in three of the fever hospitals in coöperation with the medical officers, but the number of cases so treated is not yet sufficiently large to pronounce on its value.

Cases of mistaken diagnosis, that is to say, cases of diseases properly admissible into the fever hospitals in which, either at the time of their reception at the hospital, or as the result of subsequent observation, the diagnosis of the certifying practitioner was not confirmed, numbered 3527. The disease in respect of which a mistake in the diagnosis was most common was, as usual, enteric fever. The diagnosis of enteric fever was negatived in no less than 37·9 per cent. of cases so certified, the diseases most often mistaken for enteric fever being pyrexia of unknown origin, pneumonia, enteritis, influenza, and meningitis. Diphtheria comes next with 20·9 per cent. (the figure for 1922 was 14·1), mistakes being most frequent in respect of tonsillitis, laryngitis, and Vincent's angina.

Research into problems connected with scarlet fever is being actively pursued in the Belmont Laboratories by the research pathologist to the Board, Dr. W. Mair, who contributes to this report an article on the ætiology of scarlet fever.

Tuberculosis.—The section of the report devoted to tuberculosis deals with the arrangements made for cases (*a*) of pulmonary tuberculosis, (*b*) of non-pulmonary tuberculosis. The Board has entered into arrangements with the London County Council under which they provide residential treatment for tuberculous patients in the County of London. The institutions for adult patients under their control include two sanatoriums for early cases of pulmonary tuberculosis, three hospitals for advanced cases, and one hospital for surgical tuberculosis. For children suffering from tuberculosis three institutions have been provided—two at the seaside and one in the country. Provision has been made in all for 1000 adults and about 1200 children.

Dr. James Watt, the chief medical officer of the Medical Tuberculosis Service, commenting on the statistics for pulmonary tuberculosis, pleads for more beds for advanced cases, since continued voluntary segregation would, in his opinion, do much to prevent the spread of infection. With regard to the ultimate result of treatment, as measured by the proportion of

[1] See THE LANCET, 1923, ii., 1341.

cases surviving four to five years after discharge from the sanatorium, Dr. Watt states that a misleading impression has been fostered that in general all the negative cases do well and all the positive cases do badly. The statistics of the London County Council show that only about 30 per cent. of the positive cases survive for four to five years, while about 70 per cent. of the negative class are alive at the end of that period. But it is clear from the figures given that although the prognosis is good where the lung lesion is slight, and there is not much deterioration of the general health, yet even in the negative class, where the lesion is extensive and the general health considerably affected, the issue hangs in the balance. There is a good case therefore for giving as thorough and as prolonged treatment to patients of the negative as of the positive class. A certain proportion of the former are so little deranged in health that a short period of treatment and education may suffice; but on the other hand a considerable proportion of the positive class have so little prospect of recovery, even with prolonged sanatorium treatment, that the latter is wasted on them, and could be replaced by less expensive methods of teaching the rules of healthy living.

The section of the report devoted to non-pulmonary tuberculosis, which service is under the general direction of Dr. W. T. Gordon Pugh, includes a description of Princess Mary's Hospital for Children at Margate, which has 271 beds and excellent educational facilities. Six signed articles on special points by medical officers of the tuberculosis service of the Board are appended.

Other Diseases.—Poor-law children requiring seaside air or special treatment in a hospital or convalescent home are well served. Queen Mary's Hospital, Carshalton (900 beds), and The Downs Hospital, Sutton (360 beds), take all sorts of cases. St. Anne's Home, Herne Bay, provides 15 beds at a seaside convalescent home, supplemented by beds at White Oak, Swanley.

The section of the report dealing with children includes a lengthy and copiously illustrated monograph on the Conservative Mastoid Operation and its Objects, by Mr. Charles J. Heath, consulting aural surgeon to the Downs Hospital for Children.

Venereal Diseases.—The treatment of venereal diseases at the Sheffield-street Hospital has been continued during the year; 121 women, 7 of whom had babies with them, were admitted to the hospital, while 21 babies were born in hospital. At the Thavies Inn Institution for parturient women suffering from venereal diseases, Mr. John Adams records a diminution in the number of cases of syphilis and believes that this decrease is likely to continue. During the year under review 12 mothers were admitted with syphilis, 10 infants were born alive, 6 with positive and 4 with negative W.R. As to the two stillborn fœtuses, one mother was admitted in labour and the other was confined seven days after admission, neither having had previous treatment. At St. Margaret's Hospital for ophthalmia neonatorum, where mothers may be admitted with infants, 164 women and 225 infants were admitted during the year. Dr. Doris M. Howard records that 203 infants were discharged with sight unimpaired, 19 with sight impaired in one or both eyes, and 3 blind in one eye. The hospital now undertakes the treatment of venereal disease in the mothers admitted with their babies, with good results. This hospital is not confined to Poor-law cases.

Healthy Classes.

Since 1875 the Board have received Poor-law boys for training for sea service (including many received from extra-metropolitan parishes and unions), and since 1911 they have had to deal with the "casual poor." The number of boys admitted to the training ship *Exmouth* during the year was 290. Of the boys discharged, 45 entered the Royal Navy, 153 the Mercantile Marine, and 21 were drafted into the Army as musicians. With a view to increasing the physical standards of the boys, the dietary scale on the ship has been improved by the addition of more milk and the introduction of greater variety in farinaceous foods and dried fruits. The question of a further revision of the scale is under consideration. As to the casual wards, one of the seven in use during 1922 has been closed and used as a hostel for men, carefully selected from the casual wards or from the night office, who are likely to find work.

The length of stay in the hostel is ordinarily limited to 14 days. The inmates are given a more liberal diet than is provided in the casual ward; are subject only to such regulations as are necessary for the proper conduct of the institution; and are allowed complete liberty to seek work, with the result that many situations have been found by the men. The likelihood of response to the assistance which they would be given was the sole factor in the selection of the cases, as is illustrated by the fact that the men were drawn from over 70 trades. Of the 471 cases admitted to the hostel during the first six months, 130 were known to have found employment, of whom only 15 subsequently returned to the casual wards.

The Board has approved the continuation of this apparently excellent scheme for the full period of one year for which it has been sanctioned by the Ministry of Health.

THE MILK PROBLEM AND THE MINISTRY OF HEALTH.*

THE fresh milk consumed in this country is for all practical purposes entirely home produced, in this respect differing from all our other food-supplies. There are over 2½ million dairy cattle in the country, and of these nearly 2 million are actually producing milk. The yield of milk during 1923 was 1150 million gallons, and of this the amount consumed as fresh milk was 730 million gallons. When it is remembered that some 2 per cent. of the milking cows are yielding milk containing tubercle bacilli; that much of the milk distributed for consumption as such is produced under extremely unhygienic conditions and is liable in course of production, handling, and distribution to gross contamination by dirt derived from varied sources; that such milk may be consumed by young infants, delicate children, and invalids; and that even where milk is treated by heat the process employed is rarely capable of destroying disease-producing organisms, it is abundantly clear that there exists a formidable milk problem bearing directly on the health of the community.

Importance of Milk as a Food.

In view of the great value of milk as a staple article of food, especially for the young, Sir George Newman unhesitatingly lays down that the consumption of milk ought to be much greater than it is at present. It has been estimated that the average consumption per head of our population per day amounts to no more than a quarter of a pint. This is less than half the quantity consumed in most other countries, notably in America, and it indicates that there must be a grave deficiency in the amount of milk at present consumed during the early years of their lives by the bulk of the children in this country.

The milk problem as it stands to-day presents two aspects. First, the consumer must be protected as far as possible from risk of infection by disease, especially tuberculosis, and his milk must have a satisfactory, unadulterated, nutritive value; and second, in order to increase consumption, it is necessary that milk should be attractive and appetising, of good keeping qualities, and of recognised economic value. The question of protecting the consumer resolves itself into eliminating tuberculosis from the milking herd and in protecting the milk from contamination by human and other infections, and to this end the Milk and Dairies (Consolidation) Act is designed, in conjunction with the Tuberculosis Order. As a second

* Abridged from a section of the Annual Report of the Chief Medical Officer of the Ministry of Health for 1923. London: H.M. Stationery Office.

line of defence stands the Food and Drugs Act, and finally the pasteurisation of milk. The key to ensuring good keeping qualities in milk lies in its efficient handling from the cow to the consumer.[1]

A supplementary method of raising the standard quality of milk and of educating both the producer and the consumer has been introduced in the new method of *grading* higher quality milk to be sold under special designations. The system has been introduced and maintained mainly to afford a working example of how milk can be made reasonably safe and attractive. It has had notable success in this respect, and is the parent of a growing movement amongst farmers for improving their methods. Nearly every county in England is now organising "clean milk competitions" on the basis of the Ministry's grading requirements, and the indirect educational value is unquestioned. The value of a bacteriological standard as a means of judging of the purity of milk has for many years been demonstrated in the United States, and although the method has been employed in practice in this country only during the past three or four years and on the very small scale provided by the graded milks, it has, however, sufficed to initiate a movement in the desired direction, and already the influence of and appeal to the bacterial standard shows evidence of extending far beyond the limited field at present covered by graded milks. But direct education of public opinion is also necessary. A wealthy and influential organisation representative of the trade, agricultural and public health interests, the Milk Publicity Council, already exists. Its objects are to bring about an increase in the demand for milk. It advocates the provision of a good and acceptable article as the essential basis of the success of its aims. It realises that the consumer has hitherto been suspicious of, and dissatisfied with, the quality of the supply. Ordinary milk is suspected of being a cause of disease, and its frequent premature souring is a source of loss and annoyance. In consequence condensed and dried milk, although much more expensive, have been largely substituted. It should only be a matter of time and the development of some decided interest on the part of the consuming public, says Sir George Newman, before definite standards of cleanliness and purity can be insisted on for the whole of the milk-supply.

General Methods of Milk Control.

When opportunity offered the medical officers and milk inspectors of the Ministry have made inquiries into matters relating to general milk production and have conferred with medical officers of health and sanitary inspectors on questions of local administration of regulations to ensure a clean and wholesome milk-supply made under the Dairies, Cowsheds and Milk-Shops Orders. As a result it was found that there was much scope for improvement in the quality and uniformity of administration of these regulations by local authorities in all parts of the country, and, as Sir George Newman states, it is idle to complain of the milk-supply if authorities neglect to exercise the powers they possess.

Sources of Contamination.—The chief sources of contamination are the udder and teats of the cow itself, the hands of the milker, the air, and the utensils and vessels in which the milk is collected and transported, and the principles underlying the maintenance of cleanliness are extremely simple. The regulations include the cleansing of milk vessels by steam or clean boiling water, the cleanliness of the udder and teats of the cows, and the thorough cleansing of the hands of the milkers. With the addition of adequate cooling it would be quite possible for the producer to comply with any ordinary bacterial standard which is likely to be set up for determining cleanliness in milk.

The System of Inspection.—Enforcement of those sections of the regulations dealing with cleanliness of procedure can only be secured by a well-planned system of inspection, which would include admonitory notification, followed by legal proceedings under the regulations where the failure complained of was continued. Useful work on these lines is being carried out by some local authorities, principally in urban districts. In many of the rural districts, however, owing to largeness of the areas concerned, inadequacy of the sanitary staff and indifference to such matters on the part of local councils, little or no control of any kind is exercised over the production of milk. In consequence there is a growing tendency of the larger urban centres to seek means for their own protection in regard to milk-supplies. In the United States this is the method invariably employed by the larger cities. Inspection of farms for this purpose by the city inspectors involves long journeys over wide areas. The need for such journeys is in many cases reduced considerably as a consequence of establishing a bacterial standard of purity for milk coming into the city.

The proper use of existing powers under the regulations would be strongly reinforced in this respect by the prospect for the producer: (*a*) of obtaining a better price for a better article, or (*b*) by the need for him to comply with a bacteriological standard. At the present time much of the milk collected from adjacent farms at country depôts for conveyance by the large distributing companies to urban centres is so grossly contaminated at the farm that immediately on its arrival at the depôt, often while it is still warm from the cow, it has to be put through a process of "cleaning" (i.e., straining or centrifuging), followed by pasteurisation and cooling, before it can with safety be despatched by rail to its destination. This elaborate attempt to remove from milk, dirt, which the simplest precautions taken by the producer would have excluded, adds considerably to the cost of distribution. Yet the careful producer, whose milk calls for no such treatment, seldom finds himself better off as regards the price he receives for his product than one whose milk cannot be trusted to remain sweet for a few hours without this costly special treatment. There is obviously scope here for adjustment by the trade which could not fail to benefit producers, distributors, and consumers alike.

Milk Grading.

The Milk (Special Designations) Order, 1923, came into operation during the year. The Order was designed to place on a permanent footing the system of milk grading which was developed during the war and carried out for some years under temporary orders derived from war emergency legislation. The new Order, made under the Milk and Dairies (Amendment) Act, 1922, enlarges somewhat the previously existing scheme of grading by adding a new grade in which the tuberculin test for cattle is not required, and by reserving for the term "pasteurised" as applied to milk the significance of a special process carried out under prescribed conditions. The various grades now established by the Order may be summarised as follows:—

1. *Certified Milk* must be produced from cows which have passed a prescribed tuberculin test and veterinary examination. The whole herd must be submitted to the test and veterinary examination at intervals of six months, and every animal added to the herd must be tested immediately before admission. The milk must be bottled on the farm and must not at any time contain more than 30,000 organisms per c.cm. or any coliform organisms in 0·1 c.cm.

2. *Grade A (Tuberculin Tested) Milk* is subject to the same conditions as certified milk as regards the testing and examination of cattle. The milk must be bottled before distribution and must not at any time contain more than 200,000 organisms per c.cm. or any coliform organisms in 0·01 c.cm.

3. *Grade A Milk* must satisfy the same conditions as Grade A (Tuberculin Tested) Milk, with the exception that the tuberculin test is not required and that veterinary examinations of the cows in the herd are made at intervals of three months instead of six months.

4. *Pasteurised Milk* is milk which has been pasteurised by the holder process as defined in the Order—i.e., it must be held at a temperature of 145° to 150° F. for at least half an hour and then cooled to 55° F. It must not be heated more than once and it must not contain more than 100,000

[1] Cf. THE LANCET, August 16th, 1924, p. 330.

organisms per c.cm. If the milk so treated is Grade A milk the number of organisms must not exceed 30,000 per c.cm. and there must be no coliform organisms in 0·1 c.cm. Pasteurisation or heating of Certified or Grade A (Tuberculin Tested) Milk is not allowed.

The number of licensed producers controlled directly by the Ministry at the end of 1923 was 101, an increase of 60 per cent. on the number holding licences at the end of the previous year. During the year 14 new licences for the production of Certified and 24 for Grade A (Tuberculin Tested) were issued, and none was revoked on account of failure to comply with the Order.

Visits by the Ministry's milk inspectors were made to all farms in respect of which licences had been issued directly from the department, and each farm was inspected, on an average, once every six months. Before a new licence is issued the farm of each applicant is inspected and a report made on the special score card which has been adopted by the department. This includes a survey of equipment, methods of production, identification of animals in the herd and checking records of the herd, and of the production and sale of milk.

Records kept in the department indicate that at the end of 1923 approximately 4000 animals were included in those licensed herds for which a tuberculin test is prescribed by the Order (2200 on "Certified" farms and 1800 on "Grade A (Tuberculin Tested)" farms). The milk of these grades produced during the year amounted approximately to 6000 gallons daily.

Bacteriological Examination.

Samples of milk taken for this purpose are now in all cases obtained by officers of the various local authorities in whose districts the milk is sold and are despatched by them to the bacteriological laboratory with which the local authority, with the approval of the Ministry, has arranged for the examination of these samples. The reports indicate in general a very high standard of achievement on the part of the producers concerned. In 1923, 83·4 per cent. of the samples examined were within the limits prescribed by the Order, compared with 76 per cent. in 1922, 71·8 per cent. in 1921, and 69·7 per cent. in 1920. Copies of the bacteriologist's report are in all cases sent to the producer, his attention being drawn, where necessary, to any departure from the prescribed limits. Where such has occurred a second sample is taken shortly afterwards, and if necessary a third. It is seldom, however, that the cause of failure has not been removed by the time a second sample is taken. The disclosure which the bacteriological method of control inevitably makes of failure to observe any of the essential details of clean milk production, as well as the general accuracy and fairness of the method are understood and appreciated by producers and others engaged in the trade.

Under the new Order the conditions required in connexion with the tuberculin testing of licensed herds have been revised in some particulars. These include re-tests at six-monthly intervals by the combined subcutaneous and ophthalmic methods and involve the taking of two additional pre-inoculation temperatures and one additional post-inoculation temperature at the sixth hour. These modifications were made on the recommendation of the Tuberculin Committee of the Medical Research Council, whose earlier work in the investigation of this test as applied to cattle strongly indicated the desirability of adopting these modifications. The work of this Committee has continued throughout the year, and the department is indebted to its members and especially to its chairman, Captain S. R. Douglas, for much very helpful coöperation in dealing with the many problems which have arisen in connexion with the application of the tests. It is hoped that the ultimate outcome of the Tuberculin Committee's work will be to simplify and standardise these tests and at the same time enhance their reliability and value as a diagnostic method.

The sale of stock advertised as having passed the tuberculin test appears to be on the increase. The tests in question have not always been carried out in accordance with the requirements of the Order, and licensed producers buying such animals at auction sales have been faced with the difficulty that the certificates are not accepted by the Ministry. Before adding such animals to the licensed herds licensees have been obliged to submit them to a special test which has been devised to meet such cases, but this involves additional expense, trouble, and loss of time to the producer, and it would obviously be desirable in the interests of all concerned if the Ministry's requirements in regard to the application of the test were observed in the case of cows offered for sale at auction as having passed a tuberculin test.

Pasteurisation.

It is too early for useful comment on what has been done under the Order in connexion with the use of the special process of pasteurisation for milk there defined. Manufacturers of dairy appliances have manifested considerable activity and ingenuity in devising apparatus which would enable the process to be carried out strictly in accordance with the requirements of the Order. Dr. Hamill's "Notes" [2] give a brief account of the nature and object of pasteurisation and the part which it may legitimately play in securing a safe and satisfactory milk-supply. They are also intended to serve as a guide to local authorities and others in respect of essential requirements in the design and construction of pasteurising appliances, which should be complied with in order to satisfy the provisions of the Order in regard to pasteurised milk.

The Handling of Milk.

Inquiries into the conditions under which milk is handled during transport are being carried out by the Ministry, and observations in regard to this matter are being made at the present time at the principal London railway stations. Special attention is also being given to bottling of milk. The very general practice of delivering milk from door to door in small cans filled as required from churns carried on a cart or barrow has objections owing to the contamination which the milk may receive from splashings, dust, and other inevitable pollutions from the street, and from the hands of the roundsman, who, besides handling the milk, has to drive a horse or push a barrow. The obvious nature of these objections has for long been recognised, and the delivery of milk in suitable bottles (sterilised by steam, filled under hygienic conditions in a properly conducted dairy and securely sealed) will afford adequate protection against any further contamination of the milk, not only in course of delivery, but also in the household up to the moment of its actual consumption.

The public have begun to realise the advantages which bottled milk should possess, and the demand for it is increasing. This demand is unfortunately being widely exploited by the less scrupulous section of the milk trade. Instead of the milk being bottled under strictly hygienic conditions at a proper dairy it is very frequently bottled by the roundsman in the street. A bottle which has been carried on the cart exposed to the dust of the street, or perhaps collected as an "empty" from a neighbouring customer, is filled at the tap of the churn, fitted with a cardboard disc taken by the roundsman from his pocket, or where several bottles have to be covered at the same time, from a store of discs held between his teeth, and presented to the unsuspecting customer as "Nursery Milk" or milk of some other fanciful designation of the kind. For this the consumer confidingly pays an extra price, although milk so handled is in reality much less safe than milk delivered in ordinary cans. Powers for prohibiting practices of this kind will be available when the Milk and Dairies (Consolidation) Act comes into operation in the autumn of 1925. In the meantime consumers should satisfy themselves beforehand that bottled milk has really been bottled in a proper manner.

[2] Reports on Public Health and Medical Subjects, No. 17. Notes on the Pasteurisation of Milk, by Dr. J. M. Hamill.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Medical and Pharmaceutical Advertisements.

A MOTION was laid before the Chamber of Deputies with regard to the prohibition of publicly advertising medical treatment or pharmaceutical preparations. This motion is designed to protect the public health which is threatened by the advertisements of those who claim to cure rheumatism, hernias, tuberculosis, and syphilis, and to combat the publication of announcements so worded as to induce readers to believe that they can dispense with proper medical care. The motion is particularly directed against proprietary medicines the ingredients of which the makers will not disclose in spite of the law against secret remedies, and aims at suppressing medicines accompanied by instructions for self-treatment by the purchaser, which involves transgress of the law dealing with illegal medical and pharmaceutical practice. The motion contains a unique clause which runs as follows: "From the date that this law comes into force, all publicity carried out by means of the press, by posters or otherwise, to further the medical or pharmaceutical treatment (excepting such advertisements in scientific journals published on behalf of the medical profession) will be punishable by imprisonment from five days to a month, and by a fine of 500 to 3000 francs, or by one of these penalties alone. Where the offence is repeated the punishment will be doubled."

A Proposed Sanatorium for Tuberculous Students.

The Section of Medicine of the Association Générale des Étudiants has given consideration to the question of tuberculous students in France, and now proposes to establish a sanatorium on the lines adopted by certain other industrial and university societies for their members, as, for example, the Metallurgic and Miners' Society. The site of the proposed sanatorium lies on the plateau of Petites Roches, at an altitude of 1100 metres, some 18 kilometres from Grenoble. The plans provide for a basement, a ground floor, and three upper storeys. The third storey will be erected only over the central portion of the building, and the kitchen will be situated apart from the house. In layout the sanatorium will be fan-shaped, two wings forming an open angle with the central portion, which will face south, an open gallery on the southern side will run the whole length of the ground-floor. There will be accommodation for 103 beds divided among 32 rooms each containing two beds, the other rooms being used for isolation cases. A certain number of beds will be reserved for cases of bone tuberculosis and for women students. A games room, a library, and experimental laboratories are included in the plans. The State has granted to the Association the sum of 1,300,000 francs towards the cost of establishing the sanatorium, the total expenses of which are estimated to be double that amount.

Infant Welfare Propaganda.

The Prefect of the Seine recently brought before the Academy of Medicine a proposal to publish a brochure on infant welfare, for distribution amongst the mothers of the community. The Academy, however, was of the opinion that such a pamphlet would have no greater efficacy than the health instruction posters already exhibited in many places, and that to further the cause of infant welfare the best method would be to increase the number of such posters, rather than to publish more detailed instructions in the form of a brochure.

A New Doctorate.

The diploma of "Veterinary Doctor" was established by law a year ago and the conditions under which this title of doctor may be granted to those who hold the ordinary veterinary diploma have recently been determined. The students of the National Veterinary Schools of Alfort (near Lyons), Paris, and Toulouse must submit a printed thesis to the Faculty of Medicine at their respective schools. The examining body will consist of three members, a professor of the Faculty of Medicine as president and two professors from the veterinary school. In future every veterinary student must qualify with the Diploma of Veterinary Doctor. Veterinary practitioners, under the old scheme, may obtain the new title by submitting a thesis, or in lieu, by showing a satisfactory record of previous work. Professors and former professors of the National Veterinary Schools will receive the diploma of doctor without submitting a thesis.

The "Journées Médicales" at Toulouse.

The success which has attended the Journées médicales of Brussels, which have been held annually during the last four years, incited the medical men of Toulouse to hold a similar type of local conference. These journées médicales differ from the usual congress or conference in that they are designed purely for local practitioners who cannot spare much time away from their practices, with the object of passing under review most of the problems which are of topical scientific and professional interest. Last month, therefore, Dr. Bardier, professor of experimental medicine at the University of Toulouse, assisted by the Dean, Dr. Abelous, organised with great success journées held on four days and attended by some 650 medical men. Every morning the members were given a detailed programme of the various clinical meetings, medical and surgical, that were being held in the various hospitals. In the afternoons conferences were held at the Faculty of Medicine. Among the communications made I might mention those of Dr. Vincent, Medical Inspector-General, on the colon bacillus as a pathogenic agent, on vaccinotherapy, and on the methods employed during the war to combat typhoid fever, gas gangrene, dysentery, and cholera. There was a full exhibition of field laboratory and hospital equipment. Dr. Gley, of the Collège de France, read a paper on the problem of old age and the doctrine of the glands of internal secretion; Dr. Bézy spoke on infant welfare in its sociological aspect; and Dr. Beckers, who represented the Belgian Government, dealt with recent advances in the treatment of cancer of the breast. Medical politics were fully discussed, among the speakers being Dr. Decourt, president of the Union of Medical Syndicates, and Dr. Bellencontre, president of the General Association of French Doctors. Apart from the consideration of scientific and professional questions, a pleasant programme of excursions was carried out and a visit was paid to the thermal establishment at Luchon.

SWITZERLAND.

(FROM OUR OWN CORRESPONDENT.)

Rejection of an Antivivisection Bill.

AFTER the plebiscite in the canton of Basle-Land of August 17th, throwing open medical practice to "homœopaths and herbalists," one had every reason to look forward with grave misgivings to the popular vote in the canton of Zurich of August 31st. A Bill had been brought forward, drafted by a local dentist and supported by some 20,000 citizens, which provided for the complete prohibition of vivisection—operations on animals performed by veterinary surgeons or by farmers for breeding purposes being excepted. Since in the canton of Zurich there existed strict legal provisions regulating vivisection in scientific institutes, it was difficult to see what other object the promoters of the Antivivisection Bill had in view than an attack on medical science generally. In the Cantonal Parliament of Zurich the popular Draft Bill only found one friend who in his speech called the abolition of vivisection "the realisation of a religious and civilising claim," and who could not understand why intelligent animals should have to give their life "in order to cure unreasonable men who had ruined their health by vice and passion." In the campaign preceding the vote

no demagogic device was spared to attack the legitimate methods of medical science; the anti-vivisection propagandists widely used sensational illustrations. The electorate of Zurich kept a cool head and rejected the Bill with 62,641 votes against 27,793.

The Epidemic of Mild Small-pox.

The epidemic of small-pox in Switzerland which began early in 1921 has not yet subsided. According to the annual report of the Federal Health Office in 1923, 2145 cases were notified in 1923 and 1159 cases in 1922. Small-pox here has maintained the same mildness of type as observed in the epidemic in England; so far only one death, that of an enfeebled man of 69, has been reported. Investigation into the state of vaccination amongst the small-pox patients has shown that of the 2145 cases in 1923 1791 had never been vaccinated. The epidemic is practically confined to the German-speaking cantons. This is easily explained by the fact that in the French and Italian-speaking cantons vaccination is compulsory, and the law is strictly enforced. The present epidemic puts a heavy financial burden on the country; in the last two years over a million francs (£40,000) have been spent in isolation of cases, disinfection, and transport.

Medical Study.

The number of candidates for the federal medical examinations begins to show a slight decline. In 1923 223 candidates presented themselves for the first and second examinations and 180 for the final examinations, the corresponding numbers for 1922 having been 243 and 196. This decline is welcome, although the danger of overcrowding of the profession still exists, as an annual increment of 180 qualified practitioners is far above the demand in our small country. A post-graduate course for public health officers and police surgeons, arranged by the medical faculty, will be held at Basle from Oct. 1st to 21st. Amongst the subjects which are treated by prominent Swiss scientists may be mentioned sickness and accident insurance, school and industrial hygiene, organisation of first-aid stations, regulation of midwives, food control, anthropometry, forensic medicine, modern methods of combating epidemics, and venereal disease. Apart from the lectures the sanitary institutions of the town and some industrial works will be visited. The course is open to all medical men. No fee is charged. Intending participators should apply to Prof. Doerr, Institute of Hygiene, Basle.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

Death of Prof. August Reuss.

A FEW days ago the senior of our ophthalmic surgeons, Prof. Dr. August Reuss, passed away at the age of 83 years. He was a descendant of a well-known medical family, and his son is professor of pediatrics in Vienna University. As a young man Prof. Reuss took up the study of botany, but he soon turned his attention to medicine, and became assistant of Arlt. He worked chiefly on the purely optic side of ophthalmology, and contributed valuable papers and books on colour-blindness, on the visual field in functional diseases of the nervous system, and on the hygiene of schools from the standpoint of the eye specialist. For a short time he was director of the Eye Clinic in Vienna, when Stellwag and Mauthner passed away in rapid succession. Then he founded the "Poliklinik," an institute that, under his energetic management, succeeded in becoming a second "general hospital" and almost a second University, for all the subjects of the medical student's curriculum—except anatomy—were taught at the "Poliklinik" by most competent men. In fact, an appointment to a professorship at this institute was, and is still, regarded as the last step before being called to a chair at the Vienna University. The deceased was the recipient of numerous honours during his long life, and honorary member of nearly all the ophthalmic societies of Europe.

Privileges for Doctors' Cars in Street Traffic.

In a memorandum to the Ministry of Commerce (which controls the traffic and transport here) the Medical Union demands that cars owned or run by doctors in the course of their medical work should be allowed to exceed the speed limit with impunity. This privilege is accorded only to the public first-aid ambulance and the fire-brigade, and at present the police controlling the street traffic give a certain preference to motor-cars showing the word "Arzt" (medical man) across the front. But the medical men demand to be treated on the same lines as the other two above-mentioned groups, because the urgent calls of a doctor are of equal importance. It is believed that within a short time the preferential treatment of most professional calls will be conceded by the police.

Athletes' Hearts.

The institute known as "Herzstation" (department for study of the diseases of the heart) has organised a regular examination of the hearts of individuals devoting themselves to gymnastic or athletic sports. For the last two years all the prominent members of our leading football, swimming, and boxing clubs have been examined at regular intervals, also before and after special feats, and exact records taken, including X ray photos, electro-cardiograms, and the results of functional tests. Besides, about 4500 individuals of both sexes, of ages between 14 and 36, engaged in more or less active muscular exercise, have been examined in this institute and the observations obtained thus are kept for comparison at later periods, when these individuals come back for re-examination. Valuable knowledge was obtained in this way and formed the basis of a book published by Dr. Kauf, dealing with the sporting man's heart. It is now intended to send for examination all children of 14 or over who frequent the higher schools before permitting them to take up athletics.

BELFAST MENTAL HOSPITAL.

THE annual report of the Belfast Mental Hospital for the year 1923 shows that the number of patients under treatment during the year was 997—males 480, females 517. The most prevalent form of mental disorder was melancholia—22·5 per cent. (15 males and 37 females), followed next by primary dementia, 16·4 per cent. (29 males and 9 females). General paralysis was represented by 28 males and 7 females, an increase of 20 over the previous year. Eight males and five females were cases of congenital mental deficiency. One hundred and forty-two patients were discharged; of these 88 were recovered, the recovery-rate to the total number of admissions being 38·1 per cent. This rate remains about the same as in previous years. The deaths were 71 (33 males and 38 females). The chief causes of death were general paralysis, which accounted for 22·5 per cent., cerebral softening with 16·9 per cent., and phthisis with 15·4 per cent. The chief causes of mental disorder were found to be morbid heredity, mental stress, the critical periods, and syphilis. In 4·3 per cent. of the admissions alcoholic excess was considered the principal cause of insanity, and in 9·5 per cent. it was believed to be a contributory cause. The treatment of general paralysis of the insane by the induction of malarial fever was commenced late in the year. Benefit has accrued in certain cases, but the medical superintendent, Dr. S. J. Graham, thinks it premature to decide whether the improvement will be permanent. Dr. Graham urges the necessity for fresh lunacy legislation in order to deal effectively with prevention and the incipient stages of mental disease. He urges that "it seems pitiable that one of the worst forms of disease should be denied skilled early treatment, and that it is not until the mental symptoms have developed so far as to render the individual unfit to be at large does treatment commence, following certification and its present-day attendant stigma." This matter has already been brought officially under the notice of the Government of Northern Ireland, and it is hoped that the necessary legislation will not be long delayed. The committee of the hospital has already arranged for the erection of a reception villa for incipient cases, which may hereafter be admitted as voluntary or uncertified patients.

GLASGOW MEMORIAL TO LORD LISTER.

THE movement to commemorate the great services of Lord Lister in the city in which he made, and put into practice, the discoveries which have done so much for the alleviation of human suffering, originated as far back as February, 1912, when a committee of citizens was appointed to promote the memorial and obtain the subscriptions therefor, but owing to the war the prosecution of the scheme was interrupted. The appeal for funds was most generously responded to, and the scheme generally met with the most unqualified approval. Subscriptions were received from individuals and scientific societies in this country and abroad. Various suggestions were made as to the most fitting manner in which Lord Lister's memory should be commemorated. One of the proposals which received almost universal support was the preservation of the old "Lister Ward" in the Glasgow Royal Infirmary, with the idea of making the ward a medical museum not only for the housing of personal relics of Lord Lister and of his period, but also to demonstrate the evolution of the science and art of surgery since his day. However, the managers of the Royal Infirmary declined to entertain the proposal and caused the historic ward to be demolished, notwithstanding widespread protest not only from the citizens of Glasgow but from scientific men and scientific bodies all over the world. In

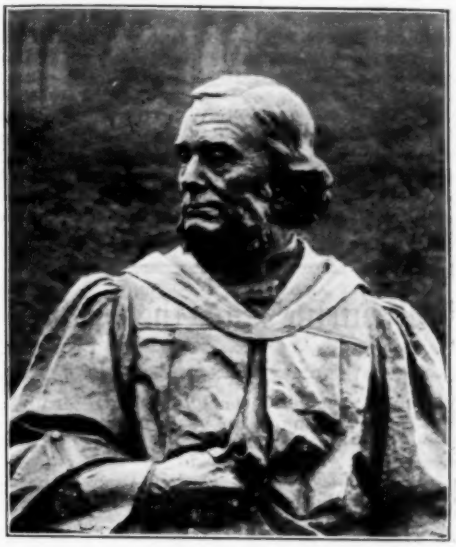
FIG. 1.

STATUE IN KELVINGROVE PARK.

the course of their labours the committee collected—largely through the personal efforts and enthusiasm of Mr. A. E. Maylard, who until recently was the senior surgeon of the Glasgow Victoria Infirmary—a number of valuable objects of interest and other relics relating to the life and period of Lord Lister, including several portraits of him; photographs of the houses and institutions with which he was connected; several documents and autograph papers; his robe, hoods, and trencher; a hundred of his books; models of old operating tables and various instruments; specimens of the dressings used by Lord Lister; examples of sprays and other apparatus which belonged to Lord Lister, and various pieces of old furniture. This collection is at present being temporarily housed in the Pathological Department of the Royal Infirmary.

When the Memorial Committee realised that the decision of the directors of the Royal Infirmary to demolish the ward was irrevocable it was decided to

FIG. 2.



LORD LISTER.

apply the funds at the committee's disposal to the erection of a statue of Lord Lister to be placed in the Kelvingrove Park, immediately below the University of Glasgow, of which he was at one time so distingusihed an ornament, and on a site adjacent to the one occupied by a similar statue of his old contemporary and colleague, Lord Kelvin. This statue, designed by Mr. Paulin, A.R.S.A., which shows Lister in his robes, seated, was unveiled on Sept. 17th by Sir Hector C. Cameron, emeritus professor of surgery in the University of Glasgow, and one of the last survivors of Lord Lister's house-surgeons and assistants. No more appropriate choice could have been made than of one who throughout his life retained the affection and regard of his great master.

In the course of his speech Sir Hector Cameron gave an interesting account of the surgery class in the University of Glasgow in 1862, when Lister was professor. "One of my fellow students," he said, "was Frederick Trendelenburg. Some years ago, in a letter which I received from him, he observed that, while we all regarded Prof. Lister with great respect and admiration, none of us could foresee that he would one day 'change surgery from the very bottom.' This was a just remark. All of us, indeed, felt conscious that we were listening to new and valuable lessons not yet in print, but little realised how great their value was or what unspeakable blessings were to flow from their development in the near future. It was not, however, until 1865 that Lister began to develop his antiseptic system of wound treatment. His subsequent achievements were not accomplished without indomitable perseverance and a marvellous patience in the face of great opposition from the majority of the leaders of his profession, especially in his own country. From the very first he was under no illusion in regard to the inevitable and hostile criticism which his doctrines must evoke, especially from those who were prejudiced by a life-long familiarity with the older teaching and the former methods of practice. Years later Lister said on one occasion that

'he had often thought that if he did deserve any credit at all it was at the time when, perfectly convinced of the truth of the principle on which he acted, and persuaded also of the enormous importance to mankind of being able to carry out that principle in practice, he worked for years together with exceedingly little encouragement from his professional brethren. There were two great exceptions, however, his father-in-law (Prof. Syme, of Edinburgh) and his students.'"

The Lord Provost of Glasgow, who is chairman of the Lord Lister Memorial Committee, presided at the ceremony, and amongst those present were the Lord Provost of Edinburgh, Sir Donald MacAlister, Principal of Glasgow University, Sir William Watson Cheyne, ex-President of the Royal College of Surgeons of England, Sir Harold J. Stiles, President of the Royal College of Surgeons, Edinburgh, Prof. T. K. Monro, President of the Royal Faculty of Physicians and Surgeons, Glasgow, Sir Thomas Oliver, of Newcastle-on-Tyne, Lord Blythswood, and Lord Maclay.

Medicine and the Law.

INQUEST VERDICT AGAINST A MEDICAL MAN.

AN inquest was held recently at Gloucester upon the body of Nellie Burnham, 10½ years of age, the daughter of a steel presser, working in America, who died on August 10th. At the conclusion of the evidence the jury returned a written verdict that "the child died from diphtheria and pneumonia, and that Dr. Hadwen failed to show competent skill and special attention, in consequence of which failure the child died." The coroner (Mr. G. Trevor Wellington) said that this in law was a verdict of manslaughter and committed upon his warrant Dr. W. R. Hadwen to take his trial at the next Gloucester assizes, allowing bail. Since then Dr. Hadwen has been brought before the magistrates and remanded on bail upon the same charge, only formal evidence being given.

At the inquest the evidence of the mother was to the effect that she called in Dr. Hadwen on August 1st to see the deceased child, who had a bad throat and talked thickly. Dr. Hadwen ordered a gargle of warm water and vinegar. He examined the child's throat, chest, and back. He saw the child again on the 4th and 6th, and told her to paint her throat with glycerine as she could not gargle. On the 9th Dr. Hadwen saw the child at 10.30 A.M., made an examination, and, according to the witness, said that there was scarcely anything the matter, and that the child would soon be well. She also said that he was in the house for only five minutes. He told her to give the child, who could not keep down the milk which he had ordered previously, milk diluted with water. A consultation of relatives was held during that day, as the result of which Dr. E. S. Ellis was called in and saw the child at 10.15 P.M. He diagnosed diphtheria and pneumonia, and held out little hope of the patient living. She died soon after midnight (12.50 A.M., August 10th). The witness said she had suspected diphtheria, but had not said so to Dr. Hadwen. Dr. Hadwen had attended other children of hers, who since he did so had been removed to the isolation hospital. Recalled later, she admitted in cross-examination that the child two days before her death had got out of bed and gone down barefoot to the kitchen to get a drink of water, and that she had not told Dr. Hadwen of this.

Dr. Ellis gave particulars of his examination of the deceased whom he found suffering from diphtheria, bronchitis, and pneumonia. He had little expectation that the child would recover, and notified the case as diphtheria. If he had found the earlier symptoms described by the mother he would have taken a swab, also pulse and temperature. He criticised the treatment ordered by Dr. Hadwen as of little value, and thought that proper treatment and accurate diagnosis ought to have saved the patient's life. He had not given a certificate as he had not attended during the illness.

An aunt of the mother corroborated her evidence as to Dr. Hadwen having said there was little the matter with the child on the morning of the 9th.

Dr. R. B. Berry, city medical officer of health, said he had received no notification of diphtheria affecting the Burnham's house from Dr. Hadwen.

Dr. W. Washbourn gave details of the condition shown by post-mortem examination. Death, in his opinion, was due to diphtheria and pneumonia. Leaving bacteriology out of the question, he thought a medical man should at least have suspected diphtheria from the clinical symptoms. Dr. Washbourn, cross-examined on behalf of Dr. Hadwen as to the incident of the child getting water from the kitchen, said that it might have resulted in a chill and brought on pneumonia. From the condition of the bronchial tubes and the adherent membrane he would ascribe death to diphtheria rather than to pneumonia.

A neighbour, whom the mother had told about the child fetching water, and who had communicated with Dr. Hadwen's solicitor, also gave evidence.

Dr. Hadwen, who was called and cautioned, declared himself willing to give evidence, and contradicted the statements of the mother in several particulars, stating that his visits had been longer and his examinations more detailed than she had described. He had attended a brother and sister of the deceased in July, and had found in them no symptoms of diphtheria, after considering the question whether they were suffering from it. On August 1st he had found the deceased suffering from a bad cold, had considered the question of diphtheria, and came to the conclusion that her case was similar to that of her brother and sister. He described her symptoms and his treatment in detail, stating that he had found the latter effective in similar cases. He had felt the child's pulse, usually looking at the throat at the same time, on each occasion that he had been to the house. He maintained that it was easy to diagnose diphtheria, as the membrane could not be mistaken. He did not take a swab because the diphtheric bacillus was found in every kind of sore-throat and in the majority of healthy throats. Several questions were asked as to this by the coroner, Dr. Hadwen maintaining his opinion and saying finally, "I should like to point out that the modern germ theory is all bosh." He said that there was no clinical symptom or physical sign of diphtheria in the deceased from first to last, but that when he saw her on the 9th there was a marked change in her condition and "inflammation of the right lung, known as croupous pneumonia." He had tried to find out the cause of the change, but had not been told of the child going downstairs. He had not told the mother that there was little the matter. Such a suggestion was absurd. He had advised her to give milk, and said it was the child's only chance, but had avoided frightening the mother as well as he could. He was emphatically of opinion that the child contracted pneumonia in going downstairs and died from pneumonia. The witness expressed at length his views on the bearing of the conditions observed by him and those revealed by the post-mortem examination upon this point.

The coroner, in addressing the jury, explained the distinction between negligence and gross negligence as affecting their verdict, and drew their attention to the contradictions in the evidence. They had to determine (1) whether diphtheria was the cause of death; (2) whether there was negligence by reason of failure to use competent skill and/or to give sufficient attention; (3) if they thought there was negligence, did they think it was gross? Finally, did they believe that the negligence caused contributed to or accelerated the death of the deceased? The jury's answer, which it will be observed does not follow strictly the lines suggested by the coroner, is given above.

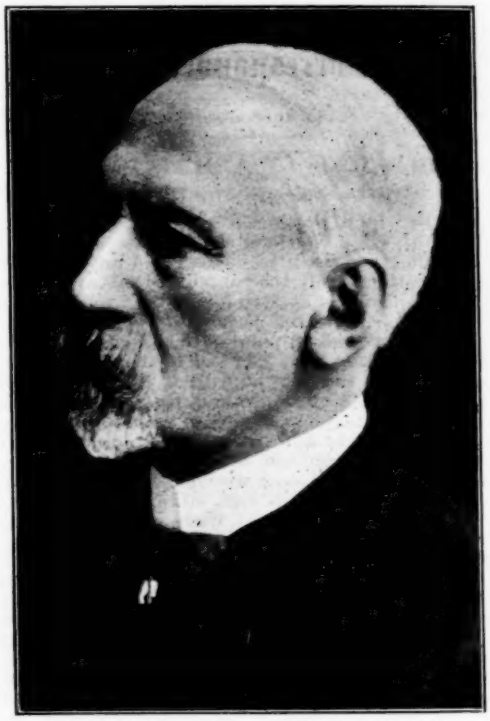
Obituary.

SIR FREDERICK NEEDHAM, M.D. ST. AND.,

COMMISSIONER OF THE BOARD OF CONTROL.

THE death of Sir Frederick Needham, for 27 years Commissioner of the Board of Control, which took place at the advanced age of 88 on Sept. 6th at his residence in Bournemouth, severs an important link with the past in the study and treatment of mental disorders, and with the numerous improvements that have taken place during the past three-quarters of a century in the conditions under which insane patients are housed and treated.

The second son of Dr. James Peacock Needham, he was born at York, where he received his early education at St. Peter's School. He studied medicine



SIR FREDERICK NEEDHAM.

at St. Bartholomew's Hospital, London, and qualified M.R.C.S. in 1858, and M.D. St. And. in 1862. Three years later he became a Member of the Royal College of Physicians of Edinburgh. On qualifying at the age of 22, Needham was appointed to the medical superintendentship of the York Hospital for the Insane (Bootham Park). Those were the days when an active campaign was still being conducted by the most enlightened of the physicians in mental disorders against the systematic use of mechanical restraint and other allied forms of treatment which, happily in this country, have long ago been discarded. Of all these devices Needham was always a stern opponent; even as respects forced alimentation by the nasal or œsophageal tube, salutary and life-saving as he admitted them to be when promptly and judiciously used, he urged that there were not a few cases in which rectal feeding was kinder, safer, and as efficacious. In this connexion and to anticipate for a moment his work as a Commissioner, it is of interest to know that it was he who, on behalf of the Board, drew up not only the Regulations made under the section in the Lunacy Act dealing with mechanical restraint, but also the definition of "seclusion"—the steady enforcement of both of which has left so deep a mark in the better treatment of the insane. Much good work was done by Needham at Bootham Park, and when he left in August of 1874 to take up the post of superintendent at Barnwood House (Gloucester)—another well-known hospital for the insane—it was in no uncertain terms that the committee of governors testified to the energy, zeal, ability, and success with which he had discharged very onerous duties during a period of 16 years.

By a somewhat curious coincidence, it was for a nearly identical period—a few months more—that he was destined to preside at Barnwood. This hospital already enjoyed a high reputation; but Needham with his now matured experience and foresight, and with the support and goodwill of his committee, was able to effect various developments and adaptations—all of which materially added to the comfort of the patients and the efficiency of their treatment and have stood the test of time—and he left the hospital occupying a still more honourable and important position. While at York he had married Charlotte, the daughter of the Rev. J. Shooter, vicar of Bishop Wilton in Yorkshire, whose wisdom and the influence of whose personality were of signal help to her husband in his work at Barnwood; and, when they left, a graceful tribute to her voluntary assistance was paid by the governors of the hospital. She died in 1907, and a stained window to her memory was placed in the chapel of the hospital.

It was in April, 1892, when Sir Clifford Allbutt relinquished his Commissionership upon being called to Cambridge as Regius Professor of Physic, that Dr. Needham was offered and accepted the post of Commissioner in Lunacy, a position he filled with conspicuous distinction until his retirement in June, 1919, and it was naturally in this capacity that his influence came to be most widely felt. Tall, dignified in appearance, and fearlessly outspoken he was by some held somewhat in awe, especially in his early days as a Commissioner; but whatever austerity of manner there may have been—and he could, indeed, be stern when occasion demanded it—this was very superficial, and closely beneath it was a kindliness of heart, a uniformly good temper, and a full measure of that spirit of helpfulness which has been said to give to the profession of medicine its value to humanity. Broad-minded, peculiarly tolerant of opposition and of the views of others, a most patient listener to conflicting claims, and endowed with a keen sense of justice, his judgment, opinion, and advice were of immense value and weight to the Board of Control; and it was no wonder that, when he decided to retire, his colleagues, by each and all of whom he was revered, felt his loss to be irreparable. He had a vitality, mental and physical, which enabled him, right up to his retirement and despite his advanced age, to do his full share of travelling and official visits.

If some characteristic of his attitude towards his position be sought, it can safely be said that, over and above the inspectorial and advisory duties of the Board, he always considered that any question affecting personal liberty and the propriety of remaining under certificates was of paramount concern, and that it was of vital importance to maintain a close and individual touch between the Commissioners and the patients to whom the former should at all times, either at visits or through the post, extend a sympathetic ear. His so often reiterated question, "How will this affect the patients?" might, indeed, be quoted as his work's motto. That a large section of the patients were conscious of the friend they had in Sir Frederick Needham is testified by their numerous inquiries addressed to his former colleagues as to his welfare.

In disposition somewhat retiring, Sir Frederick Needham was no recluse. In 1904 a Royal Commission on the Care and Control of the Feeble-Minded was set up, of which he was an active member. This

Commission undertook a very extensive survey of the problem, visiting various districts of England, Scotland, and Ireland, as also America and several countries of Europe. He also held office in many societies. He was at one time president and subsequently honorary member of the York Medical Society and of the Gloucestershire Medical and Surgical Association; in 1887 he was president of the Psychological Association of Great Britain and Ireland; in 1890 he was president of the Psychological Section of the British Medical Association, and he enjoyed honorary membership in the Medico-Legal Society of New York. He was a member of the Council of Epsom College. He contributed a number of thoughtful and valuable papers to medical literature; in which connexion, as characteristic of his loyalty, mention may be made that, while in his 1890 presidential address he strenuously deprecated, among other matters, the function of the magistrate in the making of reception orders as being likely to delay and hamper treatment in early stages of mental illness, he was as a Commissioner inflexible in seeing that the provisions of the Lunacy Acts and, later, of the Mental Deficiency Act were duly carried out. In 1871 he published a paper on the necessity for legislation in reference to habitual drunkards, followed a few years later by "Insanity in Relation to Society." Among his works are also "Brain Exhaustion," and "Thirty Years of Lunacy Practice." No servant of the public has better deserved the honour of knighthood, which was conferred upon him in 1915.

In 1913 Sir Frederick Needham remarried, his second wife, by whom he is survived, being Helen, daughter of Mr. W. L. Newman, of York. In the sorrow of her bereavement Lady Needham has the consolation of knowing that, as all her late husband's more intimate friends know, she brought great happiness and comfort to him in his latter years.

C. H. B.

ROBERT JAMES FARMAN, L.M.S.S.A. LOND.

Dr. R. J. Farman, secretary of the London Panel Committee, died last week at the age of 55, after an illness lasting for several months. He was born at Gosport, was educated at Ely School and Charing Cross Hospital, and qualified L.S.A. in 1894. He practised in South Wales until 1910 when he removed to Kennington, where he conducted a large general practice. He was a member of the Local Medical and Panel Committees for the County of London from their formation, retiring from practice upon being appointed secretary to these committees in September, 1920. With a vivid experience himself of general practice in industrial areas, he threw himself wholeheartedly into the interests of insurance practitioners who constantly sought his advice. With a flair for organisation, Dr. Farman was a splendid committee man, one of the rare sort who get things done. Among his activities he was a member of the allocation subcommittee of the London Insurance Committee, a member of the distribution committee, and secretary to the committee of management of the dinner held in connexion with the annual panel conferences.

Dr. B. A. Richmond, an earlier secretary of the London Panel Committee, writes: "Farman will be much missed. He was a loyal colleague and a staunch friend. Brave under great physical disabilities, a man of high ideals, untiring in his efforts for the improvement and efficiency of the insurance service. The practitioners of London are greatly in his debt."

THE LATE DR. ALBERT HAWORTH.

Dr. J. Henry Dible writes: "Haworth's passing will leave a very real gap in the Manchester medical school. His teaching ability was marked and his enthusiasm for chemistry was to him a compelling one and the central note of his character. Touched with something of the artistic temperament, musical, generous in disposition, and with a keen sense of humour, he was an extraordinary likable personality. His popularity was great, both with the students, with whom he never lost touch, and with his friends in the medical school, in whose remembrance he will always live, a bright, human, and lovable figure. His bent was almost wholly chemical, and he was given leave for a period to study the current methods of chemical pathology at St. Thomas's Hospital. On his return to Manchester he organised a department for teaching this subject and was made assistant lecturer in chemical pathology in 1922. In this post he succeeded eminently, having true enthusiasm for his subject and a very genuine gift for teaching it. His keenness and personal method of teaching reacted upon his students, and his course became at once successful and greatly appreciated. At the same time he engaged in research work upon various metabolic problems, especially upon conditions affecting the blood-sugar and, latterly, upon renal function in experimental nephritis."

Correspondence.

"Audi alteram partem."

THE DIAGNOSIS OF A HEALTHY HEART.

To the Editor of THE LANCET.

SIR,—Dr. John Parkinson's address in your issue of Sept. 6th is an excellent and concise summary of the cardiology of the present day, and any physician who knows thoroughly the contents of this article, and can act on them, has little to fear in the way of making grave mistakes. I think perhaps it will be generally agreed that the weakest point with the average general practitioner is his knowledge of heart cases. Many are now able to recognise and treat auricular fibrillation, but it is still quite common to see patients who exhibit merely the phenomenon of premature contractions condemned to a life of invalidism on account of their heart, whereas the heart is perfectly sound. If the general practitioner would realise that so long as a patient exhibits no sign either of shortness of breath or pain in the chest, there is little to worry about as regards stethoscopic findings, fewer people would be condemned to a life of invalidism. Patients so condemned rapidly become cardiac neurasthenics.

There is one statement in the article that I cannot reconcile with the teachings of Sir James Mackenzie and Sir Thomas Lewis. Dr. Parkinson states that paroxysmal tachycardia is "the best example we can quote of a functional heart disease." But is it a functional disease? I have always understood that this condition denotes myocardial changes. Sir Thomas Lewis writes ("Clinical Disorders of the Heart Beat"): "The attacks are themselves important indications of muscle damage, and the attacks frequently place the life of the patient in jeopardy," and again, "The prognosis of the individual attacks contains an element of uncertainty. Death during paroxysms has occurred on not a few occasions." I have never seen a death from paroxysmal tachycardia, but I have seen some cases certainly in a state of jeopardy. Can a "functional" state produce this? If it can, is it functional? We know that in some of these cases the grade of heart failure is sometimes grave in the extreme. We know that œdema of the ankles and face may occur, that blood-stained sputum is brought up, that there may be marked basal œdema (a certain sign of cardiac failure), and that later the patient may collapse and go through the stages of progressive failure, delirium, ascites, general anasarca, and death. We know, too, that cyanosis and general venous engorgement may take place, along with bulging of the liver and even enlargement of the spleen. Can these things be regarded as "functional"? If so, it is a functional disease of the heart that may kill.

With patients with true paroxysmal tachycardia it has been my habit in the past to give the relatives

a guarded prognosis; I have stated to them that, although the chances of the condition proving fatal are remote, the patient cannot be regarded as having a sound heart and that catastrophe is possible. Have I been giving a prognosis more guarded than was really necessary? Is one entitled to tell the relatives that the condition is purely functional and that there need be no anxiety?

I am, Sir, yours faithfully,

Margate, Sept. 9th, 1924. A. GRAHAM-STEWART.

THE PRESENCE OF A THIRD TYPE OF CELL IN THE GLANDS OF THE STOMACH.

To the Editor of THE LANCET.

SIR,—Some recent experiments carried out with certain new staining methods have revealed a third type of cell in the stomach glands. They were first observed in the central portion of the stomach, either wedged in between the oxyntic cells and the peptic cells, or were more frequently situated amongst the peptic cells. They were found scattered singly throughout the glands. The cells are small and granular and have a round nucleus. When stained by a special method their staining is quite different from either the oxyntic or the peptic cells, and, with their special structure and characters revealed, they can be easily seen and differentiated. Their distribution in the stomach of man and various animals is now being investigated, as is also the possibility of there being a similar type of cell in the intestinal glands. It seems possible that the secretion from these cells may play an essential part in activating the pepsinogen.

A full description of these cells and their distribution and the staining methods by which they can be demonstrated will be published.

I am, Sir, yours faithfully,

FREDERICK W. TWORT, M.R.C.S., L.R.C.P.,
Superintendent of the Brown Institution,
Sept. 15th, 1924. University of London.

COCAINE FOR EUTHANASIA.

To the Editor of THE LANCET.

SIR,—For several years I have used cocaine in the last stages of phthisis. Its benefits are so great and its use apparently so little known that a note on the subject may be justified. In the later stages of phthisis patients may be remarkably comfortable, especially if it is a pure tuberculous invasion with little or no added infection—or they may be carried off by a sudden hæmoptysis and be spared the suffering of the last phase. I have several times seen children dying of this disease remain calm and comparatively happy to the very end whose lungs have been riddled with disease and containing large cavities; they have slept a great deal and have appeared to suffer very little. Frequently, however, this is not the picture. The patient becomes apprehensive, restless, sleepless, he coughs much and brings up much phlegm, he is wasted to a shadow and his bony points pain him, his throat and larynx are frequently ulcerated, it hurts him to speak, to swallow, or even to breathe, coughing may become an agony to him and to others. Morphia may give immense comfort in some cases, but almost always when this is started a rapid deterioration takes place; in others less relief is given and there may be nausea and vomiting with flatulence, abdominal pain, and distension. The breathing becomes difficult with much rattling, and the relatives beg for something more to be done. It is just in such cases that I have found cocaine so useful. After its administration the patient becomes calmer, happier, the rattling often ceases, and almost a smile will come over the features. In an earlier stage than this, too, when death is long in coming and the patient seems to cling desperately to the tragic remnants of his life, cocaine will greatly relieve, and I would give it in preference to morphia or any opium derivative.

Cocaine should be given orally and by subcutaneous injection so that it may exert both its local and its general action. Enough must be given to produce a definite effect. I usually begin by giving gr. ¼ of the hydrochloride hypodermically, and gr. ¼ dissolved in some lemon juice and water with sugar to be sipped; both can be repeated as often as is desired at suitable intervals. The same treatment may be given in carcinoma of the stomach, and many other diseases where the patient dies slowly.

I am, Sir, yours faithfully,

F. G. CHANDLER, M.D. Camb., M.R.C.P. Lond.
Park-square West, N.W., Sept. 10th, 1924.

DIETETIC METABOLISM.

To the Editor of THE LANCET.

SIR,—In his interesting address in your issue of Sept. 13th, dealing with the remarkable capacity of man for metabolising almost any kind of food, Dr. C. J. Macalister suggests that dietetic variations of metabolism in man result from "recurrence, sometimes to carnivorous, sometimes towards a vegetarian type, and, if that be so, we must take it that there was a common stock from which both those types resulted." The adaptability of a living organism in its power of metabolism of other than its traditional and accustomed food is presumably a sound asset in favour of its survival. Some insects have this faculty in a high degree. Why should the female anopheles desert her native plant juices to suck mammalian blood at night? Is she in search of fresh hormones or what is the impulse? If, as Dr. Macalister suggests, there is a common stock for carnivorous and vegetarian feeders, the original ancestral form might well be a plant, for does not the sundew, tempted by the wealth of gnats in its native marsh, evolve a special method of ensnaring and a special faculty for digesting the said insects? But why stop at the sundew; have not some bacteria more or less a similar adaptability as regards metabolism? The carnivorous plant has always seemed to me to strengthen the argument in favour of a common origin of vegetable and animal life.

I am, Sir, yours faithfully,

Bentinck-street, W., Sept. 14th, 1924. DAVID WALSH

SIR MALCOLM MORRIS MEMORIAL FUND.

THE hon. secretary of the committee sends the following supplementary list of subscribers to this Fund. The total to date is £476 14*s.* 8*d.*

Messrs. Bird and Bird, Mr. A. W. Byrne.
Prof. Winifred Cullis, D.Sc.
Girls' Boarding School Co., Limited.
Mr. Arthur Morris, Mr. A. Crichton Morris, Mr. Charles A. Morris, C.V.O.
National Association for the Prevention of Tuberculosis.
Sir Herbert Thompson, Mrs. Catherine Thursby.
Dr. Bertram Watson.

Further subscriptions will be gratefully acknowledged if forwarded to the Hon. Treasurers, "Sir Malcolm Morris Memorial Fund," at 12, Stratford-place, London, W. 1.

AN IRISH HAMPDEN.—Our Irish correspondent writes as follows:—Dr. J. A. O'Halloran was summoned before the Longford district court recently for failure to exhibit a licence duty disc on his motor-car. He said that he had not paid his motor tax because there were no roads in the county, and he asked that the case might be dismissed. A fine of five shillings was imposed. A few months ago a similar procedure took place, and Dr. O'Halloran, declining to pay the fine, was sent to goal. On his arrival at the gaol, at a distance of some 60 miles from his home, he paid the fine. The police authorities were put to the expense of driving him to gaol and back by motor. As they had difficulty in obtaining a car, it is said that they had to hire Dr. O'Halloran's own car for the journey. Subsequent to this incident some attempt was made by the Longford county council to make the roads fit for traffic, but owing to a labour dispute work was abandoned. The roads of the county have been neglected for several years and are said to be almost impassable.

Medical News.

OPENING OF THE MEDICAL SCHOOLS.—The following functions will be held in connexion with the opening of the undermentioned London Medical Schools :—

St. Bartholomew's Hospital.—Old students' dinner, Wednesday, Oct. 1st, in the great hall of the hospital.

Charing Cross Hospital.—Distribution of prizes by Sir Humphry Rolleston in the out-patients' hall of the hospital, Oct. 1st, at 3.30 P.M. Chairman : Dr. W. Cecil Bosanquet. Annual dinner of past and present students, in the Adelaide Gallery, Gatti's Restaurant, Strand, W.C. 2. Chairman : Mr. Charles Gibbs.

St. George's Hospital.—Prize distribution in large lecture theatre, Wednesday, Oct. 1st, at 3 P.M. Inaugural address by Sir Isambard Owen. Annual medical school dinner, Wednesday, Oct. 1st, at the New Hotel Metropole. Chairman: Sir Isambard Owen.

King's College Hospital.—Prize distribution, Wednesday, Oct. 1st, 2.30 P.M. Inaugural address by Sir David Ferrier. Chairman : Viscount Hambleden. Past and present students' dinner, Wednesday, Oct. 1st, at the Connaught Rooms, Great Queen-street, W.C. Chairman : Mr. Charles P. Childe.

London Hospital.—Old students' dinner, Wednesday, Oct. 1st, at the Trocadero Restaurant, Shaftesbury-avenue, W.C. Chairman : Prof. William Bulloch.

St. Mary's Hospital.—Past and present students' dinner, Monday, Oct. 6th, at the Connaught Rooms, Great Queen-street, W.C. Chairman : Dr. E. M. Callender.

Middlesex Hospital.—Prize distribution in the Queen's Hall, Wednesday, Oct. 1st, 3 P.M., by Lord Birkenhead. Inaugural address by Dr. Charles Porter on Some Aspects of Preventive Medicine. Annual dinner, Wednesday, Oct. 1st, at the Hotel Cecil. Chairman : Mr. G. Gordon-Taylor.

St. Thomas's Hospital.—The annual dinner of past and present students on Friday, Oct. 24th, at Prince's Restaurant, Piccadilly, W. Chairman : Dr. Seymour Taylor.

Westminster Hospital.—Introductory address by Mr. H. J. Waring on the Medical Man of the Future, in the board room of the hospital, Thursday, Oct. 2nd, at 3 P.M.

UNIVERSITY OF DURHAM.—At the opening of the winter session of the College of Medicine, Newcastle-upon-Tyne, on Oct. 6th, the address to the students will be delivered by Sir Thomas J. Horder, Bart.

LONDON (R.F.H.) SCHOOL OF MEDICINE FOR WOMEN.—This school will celebrate its jubilee in October, in connexion with which the following celebrations will be held : (1) A service of thanksgiving for the opportunities of training, work, and service, open to women in the last 50 years, at St. Paul's Cathedral, on Saturday, Oct. 25th, 2.30 P.M. (2) Dinner in the Guildhall on Friday, Oct. 24th. (3) An evening party at the medical school, Saturday, Oct. 25th.

An attractive pamphlet just issued by this school sets out briefly its history and summarises the progress achieved in the medical education of women since its foundation in 1874. At that time there were only two women in the Medical Register and 14 students at the school. To-day there are about 2000 women on the Register, of whom more than half were educated at this school. To celebrate the jubilee of the school it is hoped to endow chairs in physiology, pathology, and anatomy, to be named after the three great women pioneers in medicine, Elizabeth Blackwell, Elizabeth Garrett Anderson, and Sophia Jex-Blake, of whom charming portraits appear in the pamphlet. Donations to the Endowment Fund should be made payable to Sir Alan Garrett Anderson, hon. treasurer to the school, and addressed to the organising secretary of the Fund, Mrs. K. B. Duffus, 8, Hunter-street, London, W.C. 1.

QUEEN'S UNIVERSITY (BELFAST) CLUB, LONDON.—The second dinner of the club will be held in the Hotel Belgravia, Grosvenor-gardens, S.W., on Thursday, Oct. 9th, at 8 P.M. Open to members and to Queen's students and graduates desirous of becoming members. The charge for the dinner will be collected at the occasion. Those intending to be present are requested to notify, not later than Oct. 6th, the hon. secs., at 17, Wimpole-street, W. Previous to the dinner there will be held the annual meeting, beginning at 7.15 P.M.

SUMMER Time will cease on Sunday next, Sept. 21st, at 3 A.M., when the clock will be put back to 2 A.M. The hour 2–3 A.M. Summer Time will thus be followed by the hour 2–3 A.M. Greenwich Time. Last year Summer Time ceased on Sunday, Sept. 16th.

DONATIONS AND BEQUESTS.—The following, among other, bequests are made under the will of the late Mr. Samuel Woolland : £2000 to St. George's Hospital ; £1000 to King Edward's Hospital Fund ; £1000 to Fulham Cancer Hospital ; £500 to the Royal Hospital at Winchester ; £500 to the Royal Devon Hospital, Exeter ; and £500 to Dr. Barnardo's Homes.

EXTENSION OF ABERGELE SANATORIUM. — The Manchester Public Health Committee have adopted a scheme to provide accommodation for 200 beds at the Abergele Sanatorium for surgical tuberculosis cases. At present there are only 10 beds for such cases at the sanatorium. The original scheme set out to provide 500 beds. The decision goes as a recommendation before the Finance Committee for approval or otherwise.

ROYAL DENTAL HOSPITAL OF LONDON.—A special Children's Department and an extension of the X ray Department are urgently needed to meet the requirements for the treatment of the poorer classes at the Royal Dental Hospital of London. The cost has been estimated at £3000, and in order to help in raising this sum a concert will be held at the Alhambra Theatre on Sunday evening, Oct. 5th, at 7 P.M. Sir Oswald Stoll has given the use of his theatre, and many well-known artists have promised to appear, including Mr. George Robey. The Prince of Wales, who is President of the hospital, has endorsed the appeal on its behalf in an autograph letter. Applications for tickets should be made to the hon. secretary, Lord Burnham's Appeal Fund, at the hospital, 32, Leicester-square, London, W.C. 2.

PROPOSED HOSPITAL FOR DISEASES OF THE HEART IN LIVERPOOL.—An influential meeting has been held in Liverpool to promote a movement for the establishment of a special hospital which would be entirely devoted to the study and treatment of diseases of the heart. The need for such a hospital for Liverpool and the surrounding district has been felt for a long time past by medical men. The meeting was addressed by Prof. Richard Caton, formerly professor of physiology, a former lord mayor of the city and pro-Chancellor of the University, also by Prof. J. M. Beattie, Sir James Paton, and others. It was unanimously resolved to take steps immediately to establish such a hospital. Suitable premises are available and substantial offers of financial assistance were announced and a general committee was nominated with Sir James Paton as chairman. The hospital will be the first of its kind in the district and will provide treatment for both in-patients and out-patients. In Liverpool alone something like 1500 persons are estimated as crippled from cardiac disease traceable to rheumatic fever.

COTTON SPINNERS' CANCER.—Information has been received by the Operative Cotton Spinners' Amalgamation that the Insurance Section of the Master Cotton Spinners' Federation has decided to accept and not to appeal against the "test" case decision at Ashton county court (THE LANCET, August 16th, p. 358) that epithelioma of the scrotum, from which a spinner had died, arose in the course of his employment and therefore falls within the scope of industrial diseases under the Workmen's Compensation Act. It is stated that the decision not to appeal was arrived at on legal advice. There are, according to the operatives' secretary, 100 cancer cases on his books awaiting decision. Much is hoped for—as a result of the publicity given to the case—in the matter of prevention of the disease. The Council of the Amalgamated Association of Operative Cotton Spinners and Twiners suggest that no worthier field in which to work can be found than for scientists by investigation to undertake the task of banishing this disease from all connexion with cotton-spinning. It is suggested that the trade itself, in conjunction with the medical profession, might investigate the cancer-producing properties of mineral oil and direct their efforts to the production of an oil innocent of such properties, or at least to the provision or improvement of preventive measures.

ARSENIC IN FOOD WRAPPERS IN SALFORD.—In his annual report of the borough of Salford for 1923 the borough analyst—Mr. J. D. Elsdon—states that when examining a sample of proprietary bread, it was discovered that the violet ink used for the printing of the wrapper contained appreciable quantities of arsenic. This led to the chemical examination of a large number of coloured wrappers and a number of coloured papers and inks used for printing. Of 51 sample wrapers nine contained an appreciable quantity of arsenic—the colours being two blue papers, five purple, and two green. The quantity of arsenic in one paper faced with a purple colour was about one-third of a grain per square foot of surface. Of nine different samples of printers' ink used for wrappers all were arsenic-free with the exception of one violet ink which contained about 10 per cent. of

arsenic calculated as arsenious oxide. The presence of the arsenic is due to the use of arsenic lakes in the colours from which the printing ink is made. It is alleged that by this means brighter colours are obtained. There is no real reason for their use. As to the milk sold in Salford, it compares favourably with that sold in other districts. With a standard—a lenient one—of more than 5 parts of sediment in 100,000—classified as "adulterated," no sample was so classified after the early months of the year. But the question of dirty milk is one of peculiar difficulty, as the retailer may quite easily remove the bulk of the visible dirt by filtration immediately before selling the milk. There may, however, be serious bacterial contamination, which is the usual concomitant of visible dirt. Out of 26 samples of jam taken and representative of the product of 20 different manufacturers, only seven, prepared by six different manufacturers, had been preserved with cane or beet sugar only. Eighteen samples from 13 vendors contained 8 to 20 per cent. of glucose syrup, while one sample contained as much as 35 per cent. of glucose syrup. Out of 32 samples of golden syrup 22 were found to be genuine golden syrup derived from cane or beet sugar products.

Appointments.

BARCLAY, J. H., M.D. Durh., has been appointed an additional Medical Referee under the Workmen's Compensation Act for the Districts of Gateshead, Hexham and Bellingham, &c.

CHAPMAN, DORA, M.B., Ch.B. Sheff., and ORD, J. W. E., M.D., C.M. McGill, Visiting Anæsthetists to the Jessop Hospital for Women.

GRAHAM, M. J., M.B., B.Ch. N.U.I., Medical Officer, Federated Malay States.

NEGUS, V. E., M.S., F.R.C.S., Junior Surgeon for Diseases of the Throat and Nose at King's College Hospital.

SELLARS, J. A., M.B., Ch.B. N.U.I., Hon. Assistant Physician, Blackburn Royal Infirmary.

THOMAS, B. M. G., M.R.C.S., L.R.C.P. Lond., Superintendent Medical Officer to the Pontypridd Board of Guardians at the Llwynypia Hospital.

WHITELAW, A. D., M.B., B.Ch., D.P.H. Camb., Temporary Assistant School Medical Officer in the Public Health Department of the City of Norwich.

WILLIAMS, H. M., M.R.C.S., L.R.C.P. Lond., D.P.H., Tuberculosis Physician to the County of Carmarthen.

Salford Royal Hospital: MCCAY, A. W., M.B., Ch.B. Edin., DAVIDSON, ALEX. W., M.B., Ch.B. Edin., House Surgeons: STOUT, A. J., M.B., Ch.B. Edin., Casualty House Surgeon.

Vacancies.

For further information refer to the advertisement columns.

Altrincham General Hospital, Cheshire.—H.S. £125.

Belgrave Hospital for Children, 1, Clapham-road, S.W.—H.P. and H.S. Each £100.

Bethnal Green Board of Guardians.—Asst. M.O. £400.

Birkenhead County Borough.—Asst. M.O. £450, res.

Bradford City.—Asst. Bacteriologist. £600.

Bradford Royal Infirmary.—Two H.S.'s and one H.P. Each £150.

Burton-upon-Trent County Borough.—Asst. M.O. £600.

Buxton, Derbyshire, Devonshire Hospital.—Asst. H.P. £150.

City of London Hospital for Diseases of the Heart, Victoria Park, E.—P.

Durham County Council, Maternity and Child Welfare.—Asst. Welfare M.O. £600.

Evelina Hospital for Children, Southwark, S.E.—H.P. £120.

Glasgow, Anderson College of Medicine, Dumbarton-road.—Chair of Surgery.

Hospital for Epilepsy and Paralysis, Maida Vale, W.—Med. Reg. £100.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S. £50. Also H.P. and Asst. Cas. O. £50.

King's Lynn, West Norfolk and King's Lynn Hospital.—Asst. Res. M.O. £150.

Leeds City.—Asst. Clin. Tuberculosis O. £600.

Leicester Royal Infirmary.—H.S. £150.

Liverpool.—M.O.H. £1800.

London Lock Hospital, 91, Dean-street, W.—H.S. £200.

Manchester, St. Mary's Hospitals.—Four H.S.'s. Each £50.

Miller General Hospital for South-East London, Greenwich-road, S.E.—Hon. M.O. for Skin Dept. H.P. £125.

Ministry of Health.—Three M.O.'s. £600.

National Hospital for Diseases of the Heart, Westmoreland-street, W.—Phys. to Out-patients.

Northampton General Hospital.—Hon. P.

Nottingham General Dispensary.—Res. S. £250.

Pietermaritzburg, S. Africa, Grey's Hospital.—H.S. £400.

Plymouth, South Devon and East Cornwall Hospital.—H.S. and H.P. £100 and £50 respectively. Also Asst. H.S. £50.

Portsmouth, St. Mary's Infirmary, &c.—Third Asst. Res. M.O. £250.

Prince of Wales's General Hospital, Tottenham, N.—H.S.'s, H.P., Each £150. Also Jun. H.S. and H.P. Each £110.

Queen's Hospital for Children, Hackney-road, E.—H.S. £100. Two H.P.'s, Cas. H.S. Each £100. Also P. in charge of Skin Dept.

Rhondda Urban District Council.—Asst. Sch. M.O. £600.

Richmond, Surrey, Royal Hospital.—Asst. H.S. £100.

Royal Chest Hospital, City-road, E.C.—P.

Royal Ear Hospital, Dean-street, Soho.—Reg. £50.

Royal Free Hospital, Gray's Inn-road, W.C.—Med. Reg.

Royal Naval Medical Service.—Surg. Lieuts. 25s. per day.

Royal Westminster Ophthalmic Hospital, King William-street, Strand, W.C.—Asst. H.S.

Seamen's Hospital Society, Greenwich.—H.S. for Albert Dock Hospital. Also H.P. and H.S. at Dreadnought Hospital. Each £150.

Shanghai Municipal Council, Public Health Department.—Asst. Path. £1250.

South London Hospital for Women, Clapham Common, S.W.—H.P. and three H.S.'s. Each £50. Clin. Asst. £1 1s. per attendance.

University College Hospital, Gower-street, W.C.—Res. M.O. £150.

Wakefield, West Riding Mental Hospital.—Jun. Asst. M.O. £400.

West End Hospital for Nervous Diseases, Regent's Park, N.W.—H.P. £150.

Western Ophthalmic Hospital, Marylebone-road, N.W.—Sen. and Jun. Non. Res. H.S. £150 and £100 respectively.

Westminster Hospital, S.W.—Hon. Asst. Administrator of Anæsthetics.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments:—St. Albans, Herts; Westerham, Kent; Kidwelly, Carmarthen.

Births, Marriages, and Deaths.

BIRTHS.

HEAF.—On Sept. 13th, at Hertford Hill, Warwick, the wife of Frederick Heaf, M.D., of a son.

LEWIN.—On Sept. 9th, at a London nursing home, to the wife of Dr. George Lewin, of 1, Haling Park-road, S. Croydon—a daughter.

MILLIGAN.—On Sept. 9th, the wife of Dr. Hubert Milligan, Cliftonville, Lytham, of a daughter.

NEELY.—On Sept. 13th, at Vernon House, Lee-road, Blackheath, the wife of Dr. Guy Neely, of a son.

WESTERMAN.—On Sept. 6th, at Snow-hill, London, E.C., the wife of Dr. Arthur Westerman, of a son.

MARRIAGES.

BERRY—ELKINS.—On Sept. 6th, at Watford Parish Church, Dr. Douglas Haycrast Berry, to Mary (Mollie), only daughter of Dr. and Mrs. F. A. Elkins, of Watford.

CORSI—DOYLE.—On Sept. 4th, at St. Paul's, Knightsbridge, Henry Corsi, F.R.C.S., to Margaret Gleaves Doyle, daughter of the late William Gleaves Doyle, F.R.G.S., and Mrs. Doyle, of Walcote, Leamington Spa.

HICKSON—WHITELOCK.—On Sept. 10th, at Whitchurch, Eric Blanford Hickson, M.R.C.S., L.R.C.P., to Joan Frances Whitelock, M.B., B.S., elder daughter of Mr. and Mrs. A. R. Whitelock, of Underwood, Whitchurch.

HILTON-PARRY—WILLIAMS.—On Sept. 10th, at St. Pancras, Dr. William Hilton-Parry, M.C., M.B., B.Ch., of Carnarvon, to Martha Williams, of Merthyr Tydvil.

KEARNEY—GRAY.—On Sept. 2nd, at The Oratory Brompton-road, W., Dr. James Kearney to Kathleen Hilda Gray, daughter of Mr. and Mrs. Frederick E. Gray, of Leyton, Essex.

QUINET—WILLCOX.—On Sept. 9th, at the Parish Church, Solihull, Warwickshire, Paul Gustave Desiré Quinet, M.B., Ch.B., M.R.C.S., L.R.C.P., to Doris Elizabeth Willcox, M.B., Ch.B., B.Sc.

SCOTT—NEEDELL.—On Sept. 12th, at the Parish Church, Hendon, James Bethune Scott, M.C., M.B., Ch.B. Vict., to Leila, only daughter of Mr. and Mrs. T. J. Needell, of Sunningfields-road, Hendon.

DEATHS.

ATTERBURY.—On July 18th, at Monowai, Graham-street, Whangarei, N.Z., Walter Atterbury, M.D., late of Finchley, aged 72.

BIDDLE.—On Sept. 14th, at Wortley, Manorgate-road, Kingston Hill, Daniel Biddle, M.R.C.S., L.S.A., aged 84.

POWER.—On Sept. 7th, at Borrisoleigh, Co. Tipperary, Dr. Joseph Power.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

THE Manager of THE LANCET would like to purchase copies of the issue of Feb. 2nd, 1924, for which subscribers may have no further use. He will be pleased to pay 1s. each for them. Such copies should be addressed to him at 423, Strand, London, W.C. 2.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, Sept. 22nd, to SATURDAY, Sept. 27th.—ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, Charing Cross. Clinical instruction every afternoon from 2 o'clock. Wed., 5 P.M., Mr. Gimblett: Clinical Demonstration on Common Affections of the Eye. Thurs., 5 P.M., Mr. Morgan: Fundus Class. Fri., 10 A.M., Mr. Hinc: Methods of Examination.—INFANTS HOSPITAL, Vincent-square, Westminster. Mon., 2 P.M., Dr. W. E. Robinson: O.P., Chest Cases. 3 P.M., The Hon. Noel Olivier Richards, M.D.: Demonstration, Nursery Hygiene and Clothing. 4 P.M., Dr. Donald Paterson: Congenital Heart Disease, with cases. Tues., 2 P.M., Dr. Eric Pritchard: O.P., Cases of Tuberculosis and Congenital Syphilis. 3 P.M., Dr. Amy Hodgson: Demonstration, Diet from 1 to 5 years. Dr. Bertram Shires: Lectures and Demonstrations: Diagnosis by X rays. Wed., 2 P.M., Dr. Helen Mackay: O.P., Selected Cases. 3 P.M., Dr. Eric Pritchard: Demonstration, Dried Milk. 4 P.M., Dr. Helen Mackay: Pyrexia and its Clinical Investigation. Thurs., 2 P.M., Dr. Donald Paterson: O.P., Special Cases. 3 P.M., Dr. Eric Pritchard: Demonstration, Patent Foods. 4 P.M., Mr. M. S. Mayou: Lecture, The Prophylaxis of Certain Eye Diseases. Fri., 2 P.M., Dr. Eric Pritchard and Members of the Staff: Round Table Consultation. 4 P.M., Dr. Helen Mackay: Lecture, Pyrexia and its Clinical Investigation. Sat., 2 P.M., Visit to the Nursery Training School, Hampstead Garden Suburb, and to Home for Blind Babies, Sunshine House, Chorley Wood.—WESTMINSTER HOSPITAL, S.W. Mon., 10.30 A.M., Mr. W. Spencer: Oral Sepsis. 11.30 A.M., Dr. Hildred Carlill: Clinical Demonstration on Medical Cases. 2 P.M., Mr. A. Evans: Wards and Cases. 4.30 P.M., Dr. Stott: Lecture, Diagnosis of Heart Diseases. Tues., 10.30 A.M., Mr. A. D. Griffith: Ophthalmic Operations. 11.30 A.M., Dr. de Souza: Hormones and Disease. 2 P.M., Mr. W. Turner: Operations. 4.30 P.M., Mr. B. Henry: Dental Radiograms and their Interpretation. Wed., 10.30 A.M., Dr. Braxton Hicks: Pathology, Importance of Detail in Collection of Laboratory Samples by the Practitioner. 2 P.M., Mr. A. Evans: Operations. 4.30 P.M., Dr. E. S. Dore: Demonstration, Skin Cases. Thurs., 10.30 A.M., Mr. G. C. Chubb: Demonstration, Nose, Throat, and Ear Cases. 11.30 A.M., Mr. Stanford Cole: Colostomy. 2 P.M., Mr. Rock Carling: Operations. 4.30 P.M., Dr. A. Stott: Treatment of Heart Diseases. Fri., 10.30 A.M., Dr. A. S. Woodwarke: The Insulin Treatment of Diabetes. 11.30 A.M., Mr. A. Goodwin: Retroversion. 2 P.M., Mr. W. Turner: Operations. 4.30 P.M., Dr. E. S. Worrall: Lecture on High-Frequency Currents and Diathermy. Sat., 11–12.30, Camberwell House, Dr. H. J. Norman: Clinical Demonstration, Mental Disease.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, Sept. 22nd.—12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Addison: Surgical Wards. 2 P.M., Mr. Bishop Harman: Eye Dept.

TUESDAY.—11 A.M., Mr. Endean: Venereal Diseases. 12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Sinclair: Surgical Out-patients.

WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 2 P.M., Dr. Owen: Medical Out-patients. 2 P.M., Dr. Pernet: Skin Dept.

THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 2 P.M., Mr. Simmonds: Surgical Out-patients. 2 P.M., Mr. MacDonald: Genito-Urinary Dept.

FRIDAY.—12 noon, Surgical Registrar: Surgical Pathology. 2 P.M., Dr. Burrell: Medical Out-patients. 2 P.M., Mr. Vlasto: Throat, Nose, and Ear Dept.

SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.

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Notes, Comments, and Abstracts.

GOVERNMENT MEDICAL SERVICES IN INDIA.

BY MAJOR-GENERAL SIR PATRICK HEHIR, K.C.I.E., C.B., I.M.S. (RET.).

THE Medical Services in India have been the subject of many inquiries, and are dealt with in the corresponding Blue-books, the Report of the Lee Commission being the latest of these. A ratification of the recommendations contained in that Report as a whole is being called for. The Commissioners themselves, probably prompted by the strained conditions they found during their comprehensive and invaluable investigation, also urge an early decision regarding their proposals. While there is full sympathy with this desire, as far as the medical services are concerned, wisdom may lie in making haste slowly, for here no less than a revolution is contemplated.

For purposes of clearness I set out much that is necessarily known to many readers, but the situation demands a more or less full story.

The Report proposes the introduction of far-reaching changes in the All-India Services on the civil side, particularly in the superior services of Provincial Governments. Medical men are specially concerned with the proposed replacement of the Indian Medical Service by the Royal Army Medical Corps (India), and the creation of a civil medical service on a provincial basis. These are changes which should not be made without much deliberation as to their immediate and ultimate effect on medical work in India. That some modification in the Government medical services in India was necessary has been obvious for the last half century. The desirability of some form of amalgamation of the R.A.M.C. and I.M.S. was prominently brought out in the late war when officers trained in two separate organisations had to work in unison in the field.

It has been contended by Indian politicians and others that in civilised countries under a constitutional government the civil and military services are separate, and they consider that this should be the case in India. It has not been sufficiently recognised that the conditions of the medical profession are complicated in India by circumstances not necessarily present in other countries; there are few grounds for comparison with countries which have a homogeneous population in which the civil medical services can be readily adjusted to meet war requirements, and in which there is only one system of medicine practised.

Schemes for Reform.

A brief review of various Commissions and Committees on this subject should elucidate the present position.

Royal Commission on Public Services (1912–15).—This Commission carried out its inquiry from 1912 to 1915, but on account of the war its Report was not published until 1917, by which time it had become obsolete in many respects. The Report stated: "From inquiries which we have made we are satisfied that under the existing arrangements the civil medical work of the country (India) has hitherto been economically and satisfactorily performed."

Montagu-Chelmsford Reform Scheme (1919).—The reform scheme gave birth to the Government of India Act (1919) which forms the present constitution of India. It introduced vast changes and authorised much wider employment of Indians in the administrative and executive work of the country. The result as far as the medical services of the country is concerned has been to introduce in our medical schools a feeling of uncertainty and insecurity which must be reflected in the numbers of Europeans anxious to undertake a medical career in India.

Verney-Lovett Committee (1919).—This Committee proposed the creation of a unified service, to be known as the Indian Medical Corps, which would discharge all the medical duties in India, civil and military, and would be composed of the existing I.M.S., to which would be added, initially, volunteers from the R.A.M.C., men selected by the Secretary of State for India from the temporary I.M.S. and R.A.M.C. officers that were then serving, and candidates from the medical schools in Great Britain and Ireland to be selected by half-yearly competitive examination in which Indian candidates with Indian qualifications would be given special facilities to compete. This Indian Medical Corps was to incorporate all members of the Indian Medical Department (assistant surgeons and subassistant surgeons). Retirement of officers with gratuities after fixed periods of service anterior to pension period was an important and special feature of the scheme. Most of the recommenda-

tions of the Verney-Lovett Committee were adopted, but the creation of an Indian Medical Corps, which was the soul of the scheme, was turned down. At the time this was the best all-round solution for a unified medical service; it seemed to meet both the military and civil medical requirements of the country, especially the latter. There are many who still look upon it as the best scheme from all points of view.

Esher Committee (1919–20).—The Esher Committee stated: "We consider that the Verney-Lovett report puts forward the only feasible scheme for a unified medical service, but we feel unable to support that scheme because it would, after the first selection had been made, permanently exclude the R.A.M.C. from India. Such exclusion would adversely affect, especially at the present time, both the large body of British troops in India, whose health has hitherto been so admirably safeguarded by the R.A.M.C., and the service itself, which would be shut out from the wide field of medical experience that India affords. . . . The amalgamation of the I.M.S. and R.A.M.C. is in present conditions impracticable." It suggested improvements in existing conditions, but advised the continuation of the two services as separate units.

Lee Commission (1924).—Regarding the medical services the Lee Commission recommends:—

"(*a*) That while all concessions granted to the All-India Services should be extended to the existing members of the I.M.S. in civil employ, no attempt should be made to perpetuate that service as at present constituted.

"(*b*) That, contrary to the recommendations of the Verney-Lovett Committee that the I.M.S. should be developed into a new Indian Medical Corps which should absorb the R.A.M.C. in India, the medical needs of both the British and Indian armies in India should be provided for, in future, by the R.A.M.C. (India) which should absorb the I.M.S."; the R.A.M.C. (India) is to be formed from the R.A.M.C., ad hoc. Of the British medical men in the civil medical service one-half should be reserved for British officers to be seconded from the R.A.M.C. (India), the remainder being obtained through the (R.A.M.C.) competitive examination held in London. If the number required to complete the authorised establishment cannot be obtained by the local government through the Public Service Commission, the deficiency is to be made up so far as possible by increased seconding of officers from the R.A.M.C. (India), the transfers from the R.A.M.C. (India) to civil would form the war reserve for the army in India.

The Report states: This scheme "is capable of adaptation to meet the requirements of the provinces for a separate medical service and to provide the necessary nucleus of British officers which we regard as vital to the needs and contentment of British civil servants in India." From this it would appear that the Lee Commission found the clamour for an independent civil medical service on a provincial basis so strong that it could no longer be resisted.

The R.A.M.C. (India): The Military Side.

In general terms it may be stated that the formation of the R.A.M.C. (India) would be a re-creation of the I.M.S. in another form. It would, however, be under one organisation, adopt one system of training, its officers would have identical aims, and its position would be one of considerable strength; the old jealousies, friction, and conflicting interests would disappear. It may confidently be expected that a good number of well-qualified young men of the home medical schools desiring an Indian career will join this service with the view to obtaining professional work in the provinces, and when political opinion has settled down they will have a full and useful life. The number of R.A.M.C. (India) officers eligible for civil employ will largely depend upon what the Commander-in-Chief in India declares to be the minimum of medical officers he requires as a war reserve. This is a sound scheme for a military-medical service for India, and if it is made to include the assistant surgeon branch of the Indian Medical Department (there does not appear any adequate reason why it should not) it can hardly be criticised, but it will be costly.

The Civil Side.

The proposals made for the civil side appear to be less satisfactory. The Public Service Commission to be brought into being is the only security that candidates for the essentially civil medical service will have. It is possible that prospective British candidates will not be satisfied with such guarantees as regards security of tenure of appointment as the Public Service Commission can give, while they would readily have sought employment in an *Imperial* Civil Medical Service such as was suggested by Lieut.-General Sir Charles Burtchaell in his note on the Verney-Lovett Committee's Report (App. II., Lee Commission's Report). It is probable that there will be few candidates for an essentially provincial service. This means that in course of time all the civil medical officers not provided through the R.A.M.C. (India) would be Indians, the speed of the Indianisation of the civil medical service being probably much more rapid than is expected in the Report. Many with long Indian experience consider it premature to reduce the number of European medical officers in civil employ. The Lee Commission's proposal would seem to introduce on the civil side too great a change, one for which the indigenous medical profession is not ready. The Report, however, admits the possibility of the adoption of its recommendations lowering the efficiency of the administrations, but considers that the risk should be taken in order to facilitate the logical evolution of the constitutional changes implied in the Government of India Act.

In the medical colleges and the hospitals connected with them the clinical chairs are reserved for provincial medical officers, if suitable men are available; it is possible, even probable, that within the ensuing ten years all these chairs will be filled by Indians. The scientific and research posts are to be thrown open to all candidates, but as there may be little or no competition from the home universities it is likely that these also, in course of time, will be filled by Indians.

Medical Education in India.

This is so supremely important a subject that its general supervision should remain in the hands of the Imperial Government. It is open to many forms of abuse. Some central professional authority should keep a firm hand in regulating and maintaining the standard of that education. The mere fact that the Central Government is the real controlling authority will itself have a potent effect in keeping up a uniformity of standard of the required dimensions. It cannot be too forcibly insisted upon that medical education in India is still in process of development. The standard of medical education will decline in direct ratio to the extent to which European medical men are eliminated from the teaching appointments. If all the medical professorships were handed over to the Indian medical men in the provinces the General Medical Council of Great Britain would soon be obliged to cease to recognise Indian medical qualifications altogether. India should be able to provide the sons and daughters of the soil with a first-class medical education; they should not be obliged to come to Great Britain for it. When colleges and hospitals thoroughly equipped in educational material, and entirely staffed by Indians can give this education, the task of the European professor will have been completed. Many years will elapse before this can happen. It is probable that to obtain a certain percentage of the best European medical men available provincial governments will offer large emoluments, especially in connexion with the teaching appointments in the medical colleges and college hospitals, and some of these will be accepted. These may initially take the form of short contracts. Such an arrangement will be extravagant and unsatisfactory. It will take some time for a new-comer to reach a maximum degree of usefulness, and when he becomes most efficient he may, for one reason or another, elect to relinquish his appointment.

The Indian Medical Service.

In the second half of the nineteenth century the Indian Medical Service was *facile princeps*, the best medical service in the world—a veritable *corps d'élite*. During that period it was recruited from the pick of the medical schools of the United Kingdom. The origin of that service in point of time practically coincides with that of our occupation of India, and it has a splendid record of devoted service to the people of that country. In late years the British candidate appointed to the I.M.S. went out to India with prospects greatly depreciated, chiefly on account of the hostility to the British element; this has been revealed in the debates of the Central and Provincial Legislative Assemblies, on political platforms, and in the press controlled by Indians. In the capital towns of several provinces there has been a boycott of I.M.S. Europeans from consulting practice, and European civil surgeons have found patients prevented from attending their hospitals by men specially posted for that purpose. It is only by recognising that all this is part of a political programme that it has been bearable.

The hope of obtaining civil employment has always been the determining factor that induced men to enter the I.M.S. But the civil side alone would not have lured the best young men from home. The military side has added to the fascination of the I.M.S. It was the combination of a commission in His Majesty's Army with the prospect of field service, together with unrivalled opportunities for a professional life, that attracted the superior men of the home medical schools to the I.M.S. India on the civil side requires the highest class of European medical men now more than ever if the fine edifice of Western medical science, which has been created by over a century of effort on the part of the I.M.S., is not to topple to the ground.

Medical Treatment of Europeans.

One great cause of anxiety among European officials in India is the decreasing possibility of obtaining medical advice for themselves and their families from doctors of their own race. This is a matter of the greatest importance if European officers are to be contented. Growing Indianisation and the large areas to be covered has made the provision of such medical advice more and more difficult. The solution of this problem by the Lee Commission seems the best possible one in the circumstances. Districts or provinces are to be grouped and a British medical officer (civil or military) is to be posted to one station in each group. The station should be easy of access. In stations where there is no British medical officer facilities are to be given for either the officer or his family to visit the medical officer or vice versâ, Government meeting the travelling expenses. Where only military medical officers are present they are to be made use of and receive the usual fees. Hospital accommodation for sick European officials and their families at the group station and in the larger hill stations would complete this solution of the problem. It may be that from the present situation in India the proposal of the Lee Commission is the only way to ensure there being a sufficient number of European medical men in India to give advice to the Europeans in the country. It is presumed that the Government is bound within certain limits to afford medical attendance to all its European employees by medical men of their own race. Neglect to do this will cause such dissatisfaction as will materially affect recruitment of Europeans for all the services. Endeavours should be made to strike the happy mean of maintaining a sufficient number of European medical officers for our military and civil services in both peace and war, and yet deal in an absolutely just and sympathetic way with the legitimate aspirations of Indians to hold their due place in the medical organisation of the country.

Action Required, but not Haste.

If the Lee Commission's proposals regarding the medical services are to be carried out it is suggested that it be done gradually. Whilst undue haste in arriving at decisions is to be deprecated, it is earnestly hoped that the Report will not share the fate of some of its predecessors by becoming obsolete before any action is taken. Political opinion is shifting rapidly in India. Many serious questions hang on the decisions, settlement of some of which is long overdue.

JAIL ADMINISTRATION IN BENGAL.[1]

THE report for 1922 commences with a short account of two mutinies that occurred in the Presidency Jail, one in April and the other in October, 1922. In the first outbreak, which was of a serious nature, 9 convicts were killed and 47 wounded, while of the jail staff one warder died from injuries received, and 36 other warders or members of the staff were injured; 14 convicts escaped, of whom 7 were subsequently captured, and the jute and oil godowns were set on fire and seriously damaged, with considerable loss of raw materials and manufactured articles. Several hundreds of political prisoners were admitted in December, 1921, and at one time there were 1400 non-coöperator and Khilaphat prisoners, in addition to the ordinary jail population. "It can thus be seen that it was impossible for the staff to cope with the enormous amount of extra work entailed. It was a time of great stress and anxiety for all concerned; the jailer and his assistants were never off duty, and great credit is due to their patience with this troublesome class of prisoner. Intense propaganda was spread among the Indian warders and seriously affected their morale." Fire had to be opened on the convicts, and troops called in to aid the jail staff. The second mutiny was not so serious, and there was no loss of life. Lieut.-Colonel W. G. Hamilton, I.M.S., Officiating Inspector-General of Prisons, Bengal, who presents this report, refers to the expression of opinion by Government of India "that non-criminal lunatics should not be committed to jail, and that criminal lunatics should not be detained in jails a day longer than is necessary." In future non-criminal lunatics belonging to Calcutta and its suburbs will be accommodated in the Bhawanipur Mental Hospital; and those belonging to Dacca and Murshidabad districts will be sent to the mental hospitals in those districts instead of to jail. "In other districts the jails must continue to take in non-criminal lunatics, a most undesirable practice." Government have sanctioned the creation of a new class—"special class prisoners," to be certified as such "on account of status, education, and character of the offence," who will be accorded special treatment at the Berhampore district jail.

[1] Bengal Secretariat Book Depôt, Calcutta, 1923.

The total admissions to jail, including transfers, numbered 84,985 in 1922 and the average daily strength was 15,220, as compared with 83,366 and 14,661 in 1921; the *convicts* numbered 43,945 admissions (including transfers), the average present being 12,512; the corresponding figures for 1921 were 42,998 and 12,211. Of the total number of convicts admitted (28,655, as stated in para. 8), 58·3 per cent. were Mahommedans, 38·7 Hindus, the remainder including Christians, Buddhists, and Jains. The Bengal Children's Act was passed during the year under review, making imprisonment illegal for children under 14 years of age, and for young persons under 16, unless under exceptional circumstances. "Unfortunately, this Act cannot be enforced owing to lack of funds for providing the necessary institutions and probation officers." The total earnings of all the jails (except the Presidency jail, the accounts of which are not forthcoming) amounted to Rs.6,81,199, giving an average per head (of those sentenced to labour) of Rs.56·6. At the Juvenile jail at Alipore, the chief industry is the manufacture of quinine tablets; 905,685 treatment tubes (each containing 20 4-grain tablets) were sold, realising a profit of Rs.1,64,207. The net earnings of the district jails amounted to Rs.2,70,926, as compared with Rs.3,45,456 in 1921. Of this total the Juvenile jail gave the best results, with an average earnings per head by those employed of Rs.1862.

In regard to the health of the prisoners of all classes in 1922, the daily average population being 15,220 (of whom 12,511 were convicts), the admissions to hospital averaged 1230 per 1000, the constantly sick 43·0, and the deaths 18·7; the daily average sick ratio was lower than in any of the four years preceding, during which it had fallen satisfactorily from 57·4 in 1918 to 45·1 in 1921. Among convicted prisoners in 1922 these three ratios were 1249·5, 31·2, and 19·1 respectively. The death-rate (18·7) was higher than in the previous year (16·0), but lower than in the years 1918–19–20, when it had been 21·3, 22·9, and 20·9, respectively; although not so low as in 1921 it was better than the five-year average, and Lieut.-Colonel Hamilton considers it to be "quite satisfactory." There were 35 cases of cholera and 16 deaths, as compared with only one case (not fatal) in 1921; at Mymensingh in Dacca division there were 22 cases and 10 deaths; and at the Presidency jail, Calcutta, there were 9 cases and 5 deaths; here the infection was probably introduced by "carriers," as the disease was prevalent in the city at the same time. The common jail scourge, dysentery, caused 1510 admissions to hospital and 39 deaths among convicted prisoners, giving ratios of 120·6 and 3·1 per 1000 respectively, as compared with 106·6 and 2·5 in the previous year. The admission ratios were highest at Chittagong (602·6) and Barisal (474·4), and the death-rate at Jalpaiguri was 15·7; it is noteworthy that in 17 jails not a single death from this cause occurred among convicted prisoners, a striking testimony to their general sanitation and good management. In conclusion, Lieut.-Colonel Hamilton states that "all jailers had a trying time during the past year, and much praise is due to them for the loyal way in which they carried out their arduous duties."

A HELP TO TRAVELLING PHOTOGRAPHERS.

To tourists or travellers devoid of the convenience of a dark room, the "tabloid" desensitiser just put on the market by Messrs. Burroughs, Wellcome and Co. will be of service. The action of the desensitiser is to remove a great proportion of the sensitiveness of the emulsion without destroying the latent image created by exposure. With its use, after one minute's treatment in the dark, development can be completed by candle-light, or (in the shadow of the body) in a room lighted by gas or electric light; and even ultra-sensitive and colour plates can be developed with care by candle-light or dim gas-light. Panchromatic plates can be developed in a comfortable light. The desensitiser is issued in cartons of 25.

COMPENSATED DISABILITY.

WE have received from Messrs. W. R. Grossmith, Ltd. (12, Burleigh-street, Strand, London, W.C. 2), a small pamphlet entitled "Nature Reproduced," in which are recorded some of the achievements of amputees who use the artificial limbs of this well-known firm. The merits of the "Anglesey" pattern artificial leg, which has been in use in this country since the middle of the last century, have long been known, but have been perhaps unduly overshadowed by the successes achieved by American types, especially those modified and improved by British makers during the war. Nevertheless, the fact remains that "Anglesey" legs, when properly made and fitted, can be as light as or even lighter than any other limb upon the market, whether made of metal, leather, wood, or composition, and their wearers have achieved notable successes in walking competitions and have taken part in all manner of sports and occupations. Recognition of the merits of any one type of limb by no means implies condemnation of other types.